

CHAPTER 4.0 Environmental Consequences

4.1 Introduction

This chapter assesses environmental impacts of implementing the alternatives described in Chapter 2. The baseline-affected environment, or existing condition, is described in Chapter 3.

4.1.1 Analytical Assumptions

The following impacts analysis was conducted with the following assumptions:

- Any requirement for the obligation of funds for projects in this Proposed RAMP/CDCA Plan Amendment and Final EIS shall be subject to the availability of funds, and none of the proposed management actions shall be interpreted to require obligation or payment of funds in violation of any applicable federal law, including the Anti-Deficiency Act, 31 USC § 1341, et seq.
- The laws, regulations, and policies that direct BLM management would be applied consistently for all alternatives.
- Short-term impacts are those expected to occur within one to five years after implementation of a management action or BMP. Long-term impacts are those that would occur after the first five years of implementation.
- For impact analysis, it is assumed that areas open for surface-disturbing activities are likely to be disturbed during the approximate 20 years that the revised RAMP would be in effect. A more precise estimate of the surface disturbance likely to occur would be difficult to develop, as it is unknown if all or part of these areas will be developed.

4.1.2 Types of Effects

This chapter considers three types of potential impacts for each resource: direct, indirect, and cumulative effects. Effects and impacts as used in this document are synonymous and could be beneficial or adverse.

Direct effects are caused by the action and occur at the same time and place as the action. Indirect effects are caused by the action and occur later in time or further in distance, but are still reasonably foreseeable. Because it can be difficult to distinguish

between direct and indirect effects, BLM policy does not require an EIS to differentiate between the two (BLM NEPA Handbook H-1790-1, Section 6.8.2). This chapter considers indirect and direct impacts together.

Cumulative impacts are those effects resulting from the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions (regardless of which agency or person undertakes such actions). Cumulative impacts could result from individually insignificant but collectively significant actions taking place over a period of time.

Section 1502.16 of the CEQ regulations forms the scientific and analytic basis for the comparisons of alternatives. Section 102(2)(C) of NEPA sets forth the elements that must be addressed in an EIS. The environmental consequences section consolidates that discussion. The discussion will include the environmental impacts of the alternatives, including any adverse environmental effects which cannot be avoided, the relationship between short-term uses of the human environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources which would be involved in the proposal should it be implemented.

4.1.3 Resources and Resource Uses Not Affected or Present in the Action Area

Resources, BLM program areas, or other aspects of the human environment that are not affected or present in the ISD Planning Area include the following: wild and scenic rivers, national scenic or historic trails, national monuments, cooperative management and protection areas, forest reserves, back country byways, wetlands, livestock grazing, and wild horses and burros.

4.1.4 Supplemental Authorities to be Considered

The NEPA is only one of many authorities that contain procedural requirements that pertain to treatment of elements of the environment when the BLM is considering a federal action. The following list includes some of the other authorities that may apply to BLM actions within the Imperial Sand Dunes Planning Area (BLM NEPA Handbook H-1790-1, Appendix 1, 2008).

- Air Quality—Clean Air Act as amended (42 USC 7401 et seq.)
- Cultural Resources—National Historic Preservation Act, as amended (16 USC 470)
- Migratory Birds—Migratory Bird Treaty Act of 1918, as amended (16 USC 703 et seq.); EO 131186, “Responsibilities of Federal Agencies to Protect Migratory Birds” January 10, 2001

- Native American Religious Concerns—American Indian Religious Freedom Act of 1978 (42 USC 1996)
- Threatened or Endangered Species—Endangered Species Act of 1983, as amended (16 USC 1531)
- Wastes, Hazardous or Solid—Resource Conservation and Recovery Act of 1976 (43 USC 6901 et seq.); Comprehensive Environmental Response Compensation, and Liability Act of 1980, as amended (43 USC 9615)
- Water Quality, Drinking or Ground—Safe Drinking Water Act, as amended (43 USC 300f et seq.); Clean Water Act of 1977 (33 USC 1251 et seq.)
- Wilderness—Federal Lands and Policy Management Act of 1976 (43 USC 1701 et seq.); Wilderness Act of 1964 (16 USC 1131 et seq.)
- Environmental Justice—EO 12898, "Environmental Justice" February 11, 1994

This document does not address Forests (Healthy Forests Restoration Action of 2003 [PL 108-148]), Wild and Scenic Rivers (Wild and Scenic Rivers Act, as amended [16 USC 1271]), Floodplains (EO 11988, as amended, Floodplain Management, May 24, 1977), and Wetlands—Riparian Zones (EO 11990 Protection of Wetlands, May 24, 1977 6740), and numerous other resources or uses because those resources or uses are not present in the Planning Area (e.g., livestock grazing, wild horse and burros).

4.1.5 Irreversible or Irretrievable Commitment of Resources

The CEQ NEPA implementing regulations (Section 102(2)(C) and Section 1502.16) require that the discussion of environmental consequences include a description of “any irreversible or irretrievable commitment of resources which would be involved in the proposal should it be implemented.”

An irreversible impact is an adverse effect for which there is no reasonable remedy or mitigation given biological, physical, socioeconomic constraints (e.g., extinction of a species or destruction of cultural resources). Similarly, an irretrievable impact is a commitment of a resource that results in its loss and/or the loss of its use (e.g., the extraction of oil and gas from underground reservoirs results in the removal from the Decision Area, or the commitment of forage to areas allocated as unavailable to livestock grazing results in the loss of its use to livestock operations). Irretrievable commitments are viewed as those in effects over the life of the plan.

Implementing any of the Proposed RAMP/CDCA Plan Amendment alternatives would result in some impacts that could be characterized as irreversible or irretrievable commitments as follows:

- Surface-disturbing activities, including mineral, energy, ROWs, and recreation, could result in an irreversible loss of vegetation resources and wildlife habitat. These activities may irreversibly alter soils; concurrently result in increases in sediment, salinity, and nonpoint source pollution; and also result in an irretrievable degradation of water quality.
- Cultural resources are by their nature irreplaceable, so altering or eliminating any such resource, be it National Register of Historic Places eligible or not, represents an irreversible impact.
- Decisions to close areas to public access would result in irretrievable loss of public access and recreation opportunity in these areas over the life of the plan.

The exact nature and extent of any irreversible and irretrievable commitment of resources cannot be defined due to uncertainties about location, scale, timing, and rate of implementation, as well as the relationship to other actions and the effectiveness of mitigation measures throughout the life of the plan.

4.1.6 Unavoidable Adverse Impacts

NEPA Section 102(C) mandates disclosure of “any adverse environmental effects which cannot be avoided should the proposal be implemented.” These are impacts for which there are no mitigation measures or impacts that remain even after the implementation of mitigation measures.

Implementation of the Proposed RAMP/CDCA Plan Amendment and subsequent activity- or project-specific plan implementation would result in unavoidable adverse impacts to some resources. Chapter 4 describes the potential impacts of implementing the Proposed RAMP/CDCA Plan Amendment. Many of these unavoidable impacts are also considered to be irreversible and/or irretrievable as discussed above in Section 4.1.5. These unavoidable, and potentially irreversible and irretrievable, adverse impacts include soil compaction and erosion, loss of vegetative cover, spread of invasive nonnative species, disturbance to and displacement of wildlife, visual intrusions on the landscape, and potential loss of cultural or paleontological resources from energy development, vegetative treatments, OHV recreational use, and recreational use.

Conversely, proposed restrictions on some activities such as OHV recreational use and energy development intended to protect sensitive resources and resource values would result in unavoidable adverse impacts to some users, operators, and permittees by limiting their ability to use public lands and potentially increasing their operating costs.

These impacts, however, are not irreversible as new direction for these activities can be provided through new guidance or an updated RAMP.

Truly unavoidable adverse impacts are considered to be those which no management guidance or level of implementation can avoid. These impacts may be reversible depending on the extent and severity. Examples of which are the continued dumping of household or industrial waste on public lands or the devastation caused by severe wildland fires. These unavoidable adverse impacts can be broadly defined by three categories: natural, unintentional, and illegal.

Changes in wildlife habitat from wildfire, invasive plants, or restoration treatments may be considered unavoidable adverse impacts resulting from a naturally occurring event.

Unintentional unavoidable impacts are those where lack of knowledge leads to an unforeseen impact to a resource. Undiscovered cultural and paleontological resources could be unintentionally affected by general use of public lands such as dispersed camping on an unmarked cultural site. These impacts could be avoided through the identification of such resources; however, identification may promote the third category of unavoidable impacts, illegal activity (e.g., looting).

Illegal activities on BLM lands are considered unavoidable because damages caused typically exceed any restitution paid, assuming the perpetrator is discovered and fined. Illegal activities range from vandalism of sensitive cultural resources to destruction of natural habitats and disposal of hazardous materials or household waste.

4.1.7 Short-term versus Long-term Productivity of the Environment

NEPA requires consideration of the relationship between short-term uses of the environment and long-term productivity associated with the Proposed RAMP/CDCA Plan Amendment. This involves the consideration of whether the Proposed RAMP/CDCA Plan Amendment would sacrifice a resource value that might benefit the environment in the long-term for some short-term value to the public. For purposes of this discussion, short-term refers to three years or less and long-term refers to three years or longer.

4.1.8 Cumulative Scenario Approach

This Proposed RAMP/CDCA Plan Amendment and Final EIS analyze the cumulative impact of the plan with the effects that may be in common with other past, present, and reasonably foreseeable future actions. The cumulative effects analysis reviews: past actions that are closely related in time or space (i.e., temporally or in geographic proximity) to the Planning Area; present actions that are ongoing; and reasonably foreseeable future actions, including those for which there are existing decisions,

funding, formal proposals or which are highly probable, based on known opportunities or trends.

The intensity or severity of cumulative impacts considers the magnitude, geographic extent, duration, and frequency of effects (CEQ 1997). The magnitude of an effect reflects relative size or amount of an effect. Geographic extent considers how widespread the effect might be. Duration or frequency refers to whether the effect is a one-time event, intermittent, or chronic (CEQ 1997). Cumulative effects analysis is limited to those resources that would be directly impacted by the Proposed RAMP/CDCA Plan Amendment or the alternatives.

The cumulative scenario for the Proposed RAMP/CDCA Plan Amendment and Final EIS includes projects and actions identified in Table 4-1 and Map 4-1. The cumulative scenario was compiled from information provided during public scoping, public comment, BLM Field Office and State Office staff input, BLM project lists in the vicinity of the Planning Area, and information gathered from Imperial County. Table 4-2 identifies each resource or BLM program, the cumulative analysis impact area (which is the geographic scope for each cumulative effects issue), elements to consider, and activities or projects that are located or would occur within the cumulative impacts area. The majority of the projects listed in Table 4-1 have been, are being, or would be required to undergo appropriate independent environmental review under NEPA or the California Environmental Quality Act, as applicable. Additional analysis is included for each resource area within the sub-sections below.

4.1.9 Mitigation Measures Included in the Analysis

Under NEPA, significance is defined by CEQ (Section §1508.27) as a measure of the intensity and context of the effects of a major federal action on the human environment. The BLM NEPA Handbook reiterates this directive, stating that the document should “focus the discussion of effects on the context, intensity, and duration.” Intensity refers to the severity or level of magnitude of impacts. Public health and safety, proximity to sensitive areas, level of controversy, unique risks, or potentially precedent-setting effects may all be considered in determining intensity of effect. Context means that the effects of an action must be analyzed within a framework or within physical or conceptual limits. Whenever possible, this document differentiates between short-term and long-term impacts.

**TABLE 4-1
CUMULATIVE PROJECTS LIST**

#	Project Name	Location	Project Type	Status	Acres	Project Description
	Existing Projects/Under Construction					
1	Hudson Ranch I	South of Niland	Geothermal Energy	Operational as of May 2012	326	Consists of four production wells and four injection wells, will produce up to 49.9 MW of power
2	Hudson Ranch II	South of Niland	Geothermal Energy	Under construction	326	Development of a 49.9-MW geothermal energy facility; includes power plant, four production wells and brine pipeline
3	ORNI 18	North of Brawley	Geothermal Energy	Operational	N/A	49.9 MW geothermal power plant
4	Mesquite Regional Landfill	Imperial County, 5 miles northeast of Glamis on SR-78	Landfill	Final EIS 1995, landfill is operational	4,250	Landfill accepts municipal solid waste; permitted to receive nonhazardous (Class III) municipal solid waste from southern California counties, including by rail.
5	Niland Gas Turbine Plant	NE of Niland	IID Plant	Operational	22	93-MW simple-cycle power plant, adjacent to Niland Substation
6	Niland Substation Upgrade	Niland area	IID Plant	In progress	N/A	Installation of new 92/13.2-kV 25-MVA substation next to existing switch station
7	Midway to Bannister Transmission Line	Calipatria/Niland area	IID line	Phase I construction completed	N/A	230-kV transmission line; four phases
8	KN/KS Transmission Line	West Chocolate Mountain area	IID line	Existing	N/A	230-kV transmission line upgrade (Highline to Mirage); interconnects to the Mirage Substation
9	F-Line	West Chocolate Mountain Area	IID line	Existing	N/A	161-kV transmission line (Midway to Blythe)
10	N-Line	West Chocolate Mountain Area	IID line	Existing	N/A	92-kV transmission line (Midway to Coachella Valley); connects to Mirage Substation
11	Ormesa Complex	East Mesa	Geothermal Energy	Operational	N/A	Plants have a generating capacity of 57 MW
12	Calexico Solar Farm I	West of Calexico	Solar Energy	Under construction	1,013	200-MW solar project on agricultural lands (two phases of 100 MW each)

**TABLE 4-1
CUMULATIVE PROJECTS LIST**

#	Project Name	Location	Project Type	Status	Acres	Project Description
13	Calexico Solar Farm II	West of Calexico	Solar Energy	In progress, service date estimate 2014	1,477	200-MW solar project (two phases of 100 MW each)
14	Imperial Solar Energy Center South Solar Farm	Imperial Valley south	Solar Energy	ROW granted 6/14/2011	946.6	200-MW solar facility; transmission line to Imperial Valley Substation; roadway widening for access
15	Centinela Solar Farm	Imperial Valley south	Solar Energy	Decision Record 11/2011	2,067	175-MW solar facility (planned completion in 2014); associated transmission line
16	Imperial Valley Solar West Solar Farm	Imperial Valley southwest of Seeley	Solar Energy	Decision Record 8/2011	1,130	250-MW solar energy facility and associated transmission line to Imperial Valley Substation
17	Sunrise Powerlink - Transmission	San Diego County to Imperial Valley Substation	Transmission Line	Under construction	282.3	150-mile transmission line from Imperial County (Imperial Valley Substation) to Sycamore Canyon near Poway
18	Ocotillo Express Wind Farm	Imperial County West	Wind Energy	Final Environmental Impact Report and Final EIS 3/2012	1,167	About 465-MW wind energy project
19	Managed Marsh Complex	Salton Sea	IID Project	Phase I construction complete	959	The marsh is a three-phase complex of habitat for Imperial Irrigation District's Habitat Conservation Plan Drain Covered Species
	Foreseeable Projects					
20	Frink Road Solar Power	Niland	Solar Energy	Imperial County review	280	Proposed 30.4-MV photovoltaic solar energy facility
21	Wister Solar	Niland	Solar Energy	Imperial County approved 2010	148	Proposed 20-MW solar facility
22	Chocolate Mountain Solar	Niland	Solar Energy	Imperial County review	320	Proposed 49.9-MW photovoltaic solar energy facility
23	Wister – Ormat (AKA ORNI 21)	West Chocolate area	Geothermal Energy	Imperial County review	220	Proposed 49-MW geothermal facility
24	Imperial Valley Solar Co	Niland	Solar Energy	Imperial County review	123	Proposed 23-MW photovoltaic solar energy facility

**TABLE 4-1
CUMULATIVE PROJECTS LIST**

#	Project Name	Location	Project Type	Status	Acres	Project Description
25	Energy Source Solar II	Niland	Solar Energy	Imperial County review	480	Proposed 80-MW photovoltaic solar energy facility
26	Salton Sea Ecosystem Restoration Project	Salton Sea	Habitat Restoration	Imperial County review	N/A	Several components of restoration; projected to start in 2014
27	Salton Sea Species Conservation Habitat Project	Salton Sea	Habitat construction	EIS/EIR in prep	2,400	Construct habitat in interconnected shallow ponds within footprint of the Salton Sea; phased construction
28	JJ Elmore	South of Niland	Geothermal Energy	Imperial County review	N/A	N/A
29	JM Leathers	South of Niland	Geothermal Energy	Imperial County review	N/A	N/A
30	Black Rock Unit 1, 2, 3	South of Niland	Geothermal Energy	Imperial County review	160	Proposed 159-MW geothermal energy facility
31	Black Rock 5,6	South of Niland	Geothermal Energy	Imperial County review	160	Proposed 159-MW geothermal energy facility
32	Black Rock 7, 8, 9	South of Niland	Geothermal Energy	Imperial County review	N/A	Proposed 159-MW geothermal energy facility
33	Black Mountain Wind	Black Mountain Area	Wind Energy	POD in progress	15,335	Wind energy testing ongoing; proposed development for 48- to 65-MW wind energy facility
34	Iberdrola Wind Project	Black Valley, near SR 78 and Ogilby Road	Wind Energy	BLM review	11,227	Proposed 129.6- to 180-MW wind energy facility
35	Gold Basin Wind Project	East of Imperial Sand Dunes	Wind Energy	Pending USFWS and BLM review	8,446	Proposed wind energy testing
36	Ogilby Solar Project	West of Ogilby Road	Solar Energy	BLM review	7,405	Proposed 450-MW solar thermal (trough) project
37	Del Ranch	South of Niland	Geothermal Energy	Imperial County review	N/A	N/A
38	Vulcan Turbo	South of Niland	Geothermal Energy	Imperial County review	N/A	N/A
39	Midway Solar Farm I	Calipatria	Solar Energy	Imperial County review	326	Proposed 50-MW photovoltaic solar energy facility

**TABLE 4-1
CUMULATIVE PROJECTS LIST**

#	Project Name	Location	Project Type	Status	Acres	Project Description
40	Midway Solar Farm II	Calipatria	Solar Energy	Imperial County review	803	Proposed 155-MW photovoltaic solar energy facility
41	Salton Sea Solar Farm I	Calipatria	Solar Energy	Imperial County review	320	Proposed 49.9-MW solar energy facility
42	Salton Sea Solar Farm II	Calipatria	Solar Energy	Imperial County review	623	Proposed 100-MW solar energy facility
43	Sonora Solar (Solar Gen2)	Calipatria	Solar Energy	Final EIR approved	488	Development of approximately 50-MW solar facility
44	Arkansas Solar (Solar Gen2)	Calipatria	Solar Energy	Final EIR approved	481	Development of approximately 50-MW solar facility
45	Alhambra (Solar Gen2)	Calipatria	Solar Energy	Final EIR approved	482	Development of approximately 50-MW solar facility
46	Mayflower (Solar Gen2)	Calipatria	Solar Energy	Final EIR approved	558	Development of approximately 50-MW solar facility
47	Calipat Solar Farm I	Calipatria	Solar Energy	Imperial County review	290	Proposed 50-MW solar facility
48	Calipat Solar Farm II	Calipatria	Solar Energy	Imperial County review	280	Proposed 50-MW solar facility
49	Superstition Solar 1	Westmorland	Solar Energy	BLM review	5,516	Proposed 175-MW solar facility
50	ORNI 19	Brawley area	Geothermal Energy	Draft EIR published 2011	190	Proposed 49.9-MW geothermal facility, including plant, wells, and pipelines
51	Geothermal Overlay	Imperial County 8 miles east of Brawley	Geothermal	Environmental Impact Report initiation in progress	27,875	The project would create the East Brawley Geothermal Zone Overlay, which would be a contiguous area of private lands with the potential for geothermal resource development
52	Rancho Los Lagos Specific Plan	Adjacent to City of Brawley	Residential	Draft Environmental Impact Report comment response in progress; Draft EIS October 2009	1,076	Proposed up to 3,830 homes, golf course, and business park; multiple use
53	Brookfield 101 Ranch Specific Plan	Adjacent to City of Brawley to south	Residential	Draft Environmental Impact Report is in progress	1,897	Proposed up to 6,986 schools, mixed use commercial, and parks

**TABLE 4-1
CUMULATIVE PROJECTS LIST**

#	Project Name	Location	Project Type	Status	Acres	Project Description
54	Keystone Solar Farm	South of Brawley	Solar Energy	Environmental Impact Report under review	40	Proposed 6.06-MW solar field
55	Desert Springs Oasis	City of El Centro	Resort	Draft Environmental Impact Report in progress	1,105	Proposed luxury resort community
56	Alder 70	City of El Centro	Residential	Application in progress	75	Proposed mixed residential community
57	Mosaic Specific Plan	South Imperial County	Residential	Draft Environmental Impact Report September 2008; in progress	201.5	Proposed up to 1,154 homes, commercial uses
58	Bethel Solar	East of Calexico	Solar Energy	Imperial County review	571	Proposed 49.4-MW solar facility
59	Procalamos RES	Calexico area	Residential	Imperial County review	1,105	Proposed gateway residential, parks, and storage
60	Mount Signal Solar Farm	Imperial Valley south	Solar Energy	In process	1,375	Proposed 200-MW solar thermal generating station with a biomass generation component, associated 230-kV transmission line for the Imperial Irrigation District
61	Ocotillo Sol	Southeast of Ocotillo	Solar Energy	BLM review	115	Proposed 20-MW photovoltaic solar facility
62	Acorn Greenworks Solar Farm	Imperial Valley southwest	Solar Energy	Application in process	693	150-MW solar energy facility
63	Silverleaf Solar Farm	Imperial Valley southwest	Solar Energy	Application in process	1,096	160-MW solar photovoltaic energy facility
64	Campo Verde Solar Farm	Imperial Valley southwest	Solar Energy	Active Environmental Impact Report	2,266	226-MW solar energy facility
Other Ongoing Activities						
	Bureau of Reclamation	Imperial Valley	Canals	Ongoing	N/A	Canal maintenance; All American Canal Relining Project, Coachella Canal (maintenance and operation), Drop 2
	Military	Imperial Valley	Installations and ranges	Ongoing	N/A	Ongoing training activities

**TABLE 4-1
CUMULATIVE PROJECTS LIST**

#	Project Name	Location	Project Type	Status	Acres	Project Description
	Customs and Border Protection	Imperial Valley	Border security	Ongoing	N/A	Customs and Border Patrol activities (including tactical infrastructure)
	BLM Actions	Imperial Valley, within BLM-administered lands	Various	Ongoing	N/A	Road maintenance, recreation facility maintenance, restoration efforts, campground maintenance, recreational activity (including OHV organized events); filming
	Other Actions	Imperial Valley	Various	Ongoing	N/A	Electrical substation operation and maintenance, transmission and utility corridor maintenance, Interstate 8 and State Route maintenance, railroad activities, agricultural activities, recreational activity, sand and gravel mining, Imperial Irrigation District canal and drain maintenance.
	Urban Areas	El Centro, Niland, Calipatria, Imperial, Heber, Calexico, Yuma	Various	Ongoing	N/A	Road maintenance, infrastructure maintenance, urban development

**TABLE 4-2
CUMULATIVE SCENARIO**

Resource or BLM Program	Cumulative Analysis Impact Area	Elements to Consider	BLM Authorized Actions Past, Present & Reasonably Foreseeable	Other Known Actions/Activities Past, Present & Reasonably Foreseeable
Air Resources	Salton Sea Air Basin	PM _{2.5} , PM ₁₀ , ozone	Road maintenance, recreation facility maintenance, restoration efforts, campground maintenance, recreational activity (including OHV organized events); filming Renewable Energy Projects on BLM lands listed in Table 4-1	All projects listed in Table 4-1, including renewable energy projects, development projects, and ongoing activities
Global Climate Change	International, national, and regional	CO _{2e}	All cumulative projects listed in Table 4-1.	
Soil Resources	Planning Area	Erosion	Road maintenance, recreation facility maintenance, restoration efforts, campground maintenance, recreational activity (including OHV organized events); filming Renewable Energy Projects: Ogilby Solar (Pacific Solar Investments), pending. Transmission and utility corridor projects.	All American Canal Relining Project, Coachella Canal (maintenance and operation), military activities, mining, Customs and Border Patrol activities (including tactical infrastructure), Mesquite Landfill, Bureau of Reclamation (Drop 2); Interstate 8, State Route 78, and railroad; agricultural activities
Water Resources: Surface Water Ground Water	Imperial Valley groundwater basin and Amos–Ogilby–East Mesa groundwater basin	Hydrology and quality Basin balance, levels and quality	All cumulative projects listed in Table 4-1.	

**TABLE 4-2
CUMULATIVE SCENARIO**

Resource or BLM Program	Cumulative Analysis Impact Area	Elements to Consider	BLM Authorized Actions Past, Present & Reasonably Foreseeable	Other Known Actions/Activities Past, Present & Reasonably Foreseeable
Vegetative Resources	Planning Area	Natural vegetation communities, special status plants; invasive species	Road maintenance, recreation facility maintenance, restoration efforts, campground maintenance, recreational activity (including OHV organized events); filming Renewable Energy Projects: Ogilby Solar (Pacific Solar Investments), pending. Transmission and utility corridor projects.	All American Canal Relining Project, Coachella Canal (maintenance and operation), military activities, mining, Customs and Border Patrol activities (including tactical infrastructure), Mesquite Landfill, Bureau of Reclamation (Drop 2); Interstate 8, State Route 78, and railroad; agricultural activities
Wildlife Resources	Planning Area	Natural vegetation communities	Road maintenance, recreation facility maintenance, restoration efforts, campground maintenance, recreational activity (including OHV organized events); filming Renewable Energy Projects: Ogilby Solar (Pacific Solar Investments), pending. Transmission and utility corridor projects.	All American Canal Relining Project, Coachella Canal (maintenance and operation), military activities, mining, Customs and Border Patrol activities (including tactical infrastructure), Mesquite Landfill, Bureau of Reclamation (Drop 2); Interstate 8, State Route 78, and railroad; agricultural activities
Special Status Species	Planning Area, Critical Habitat Unit defined by USFWS; existing range	PMV; Mojave population of the desert tortoise; Special Status plant and animal species	All cumulative projects listed in Table 4-1.	

**TABLE 4-2
CUMULATIVE SCENARIO**

Resource or BLM Program	Cumulative Analysis Impact Area	Elements to Consider	BLM Authorized Actions Past, Present & Reasonably Foreseeable	Other Known Actions/Activities Past, Present & Reasonably Foreseeable
Wildland Fire	Planning Area	Mortality of plants and wildlife, loss of forage and cover; changes to vegetation communities; spread of invasive species; air quality	Road maintenance, recreation facility maintenance, restoration efforts, campground maintenance, recreational activity (including OHV organized events); filming Renewable Energy Projects: Ogilby Solar (Pacific Solar Investments), pending. Transmission and utility corridor projects.	All American Canal Relining Project, Coachella Canal (maintenance and operation), military activities, mining, Customs and Border Patrol activities (including tactical infrastructure), Mesquite Landfill, Bureau of Reclamation (Drop 2); Interstate 8, State Route 78, and railroad; agricultural activities
Cultural Resources	Planning Area	Cultural resources (prehistoric and historic); ethnographic resources; cultural character of sites and vicinity	Road maintenance, recreation facility maintenance, restoration efforts, campground maintenance, recreational activity (including OHV organized events); filming Renewable Energy Projects: Ogilby Solar (Pacific Solar Investments), pending. Transmission and utility corridor projects.	All American Canal Relining Project, Coachella Canal (maintenance and operation), military activities, mining, Customs and Border Patrol activities (including tactical infrastructure), Mesquite Landfill, Bureau of Reclamation (Drop 2); Interstate 8, State Route 78, and railroad; agricultural activities

**TABLE 4-2
CUMULATIVE SCENARIO**

Resource or BLM Program	Cumulative Analysis Impact Area	Elements to Consider	BLM Authorized Actions Past, Present & Reasonably Foreseeable	Other Known Actions/Activities Past, Present & Reasonably Foreseeable
Paleontological Resources	Planning Area	Surface disturbing activities; rock units with high sensitivity or known paleontological resources	Road maintenance, recreation facility maintenance, restoration efforts, campground maintenance, recreational activity (including OHV organized events); filming Renewable Energy Projects: Ogilby Solar (Pacific Solar Investments), pending. Transmission and utility corridor projects.	All American Canal Relining Project, Coachella Canal (maintenance and operation), military activities, mining, Customs and Border Patrol activities (including tactical infrastructure), Mesquite Landfill, Bureau of Reclamation (Drop 2); Interstate 8, State Route 78, and railroad; agricultural activities
Multiple Use Classes	Planning Area	Restriction or preclusion of otherwise allowable use opportunities	Road maintenance, recreation facility maintenance, restoration efforts, campground maintenance, recreational activity (including OHV organized events); filming Renewable Energy Projects: Ogilby Solar (Pacific Solar Investments), pending. Transmission and utility corridor projects.	All American Canal Relining Project, Coachella Canal (maintenance and operation), military activities, mining, Customs and Border Patrol activities (including tactical infrastructure), Mesquite Landfill, Bureau of Reclamation (Drop 2); Interstate 8, State Route 78, and railroad; agricultural activities

**TABLE 4-2
CUMULATIVE SCENARIO**

Resource or BLM Program	Cumulative Analysis Impact Area	Elements to Consider	BLM Authorized Actions Past, Present & Reasonably Foreseeable	Other Known Actions/Activities Past, Present & Reasonably Foreseeable
Visual Resources	I-8 corridor, SR-78 corridor; Planning Area	OHV recreation related dust and activity; other recreational activity; recreational development; other development (renewable energy, mining, geothermal); views from key observation points	Road maintenance, recreation facility maintenance, restoration efforts, campground maintenance, recreational activity (including OHV organized events); filming Renewable Energy Projects: Ogilby Solar (Pacific Solar Investments), pending; Ormesa Complex. Transmission and utility corridor projects.	All American Canal Relining Project, Coachella Canal (maintenance and operation), military activities, mining, Customs and Border Patrol activities (including tactical infrastructure), Mesquite Landfill, Bureau of Reclamation (Drop 2); Interstate 8, State Route 78, and railroad; agricultural activities
Special Designations	Planning Area (Wilderness Area within Planning Area; ACECs; National Natural Landmark)	Views, noise, recreation activities	Road maintenance, recreation facility maintenance, restoration efforts, campground maintenance, recreational activity (including OHV organized events); filming Renewable Energy Projects: Ogilby Solar (Pacific Solar Investments), pending. Transmission and utility corridor projects.	All American Canal Relining Project, Coachella Canal (maintenance and operation), military activities, mining, Customs and Border Patrol activities (including tactical infrastructure), Mesquite Landfill, Bureau of Reclamation (Drop 2); Interstate 8, State Route 78, and railroad; agricultural activities

**TABLE 4-2
CUMULATIVE SCENARIO**

Resource or BLM Program	Cumulative Analysis Impact Area	Elements to Consider	BLM Authorized Actions Past, Present & Reasonably Foreseeable	Other Known Actions/Activities Past, Present & Reasonably Foreseeable
Mineral Resources	Planning Area	Mineral resource availability	Road maintenance, recreation facility maintenance, restoration efforts, campground maintenance, recreational activity (including OHV organized events); filming Renewable Energy Projects: Ogilby Solar (Pacific Solar Investments), pending. Transmission and utility corridor projects.	All American Canal Relining Project, Coachella Canal (maintenance and operation), military activities, mining, Customs and Border Patrol activities (including tactical infrastructure), Mesquite Landfill, Bureau of Reclamation (Drop 2); Interstate 8, State Route 78, and railroad; agricultural activities
Recreation Management	Planning Area	Dispersed recreation opportunities and experiences, ACECs, Wilderness	All cumulative projects listed in Table 4-1.	
Transportation and Public Access	I-8 corridor; SR-78 corridor; Ogilby Road; Ted Kipf Road; Wash Road	Visitor traffic and access; OHV recreation opportunities; changes in viewscape; unauthorized routes	Road maintenance, recreation facility maintenance, restoration efforts, campground maintenance, recreational activity (including OHV organized events); filming Renewable Energy Projects: Ogilby Solar (Pacific Solar Investments), pending; Ormesa Complex. Transmission and utility corridor projects.	All American Canal Relining Project, Coachella Canal (maintenance and operation), military activities, mining, Customs and Border Patrol activities (including tactical infrastructure), Mesquite Landfill, Bureau of Reclamation (Drop 2); Interstate 8, State Route 78, and railroad; agricultural activities

**TABLE 4-2
CUMULATIVE SCENARIO**

Resource or BLM Program	Cumulative Analysis Impact Area	Elements to Consider	BLM Authorized Actions Past, Present & Reasonably Foreseeable	Other Known Actions/Activities Past, Present & Reasonably Foreseeable
Lands and Realty Program	Planning Area and vicinity	Designated utility corridors (e.g., transmission lines, communication sites); existing ROWs; I-8 and SR-78	Road maintenance, recreation facility maintenance, restoration efforts, campground maintenance, recreational activity (including OHV organized events); filming Renewable Energy Projects: Ogilby Solar (Pacific Solar Investments), pending; Ormesa Complex. Transmission and utility corridor projects.	All American Canal Relining Project, Coachella Canal (maintenance and operation), military activities, mining, Customs and Border Patrol activities (including tactical infrastructure), Mesquite Landfill, Bureau of Reclamation (Drop 2); Interstate 8, State Route 78, and railroad; agricultural activities
Public Health and Safety	Planning Area and vicinity	Emergency vehicle access; fire hazards; hazards waste; recreational safety	Road maintenance, recreation facility maintenance, restoration efforts, campground maintenance, recreational activity (including OHV organized events); filming Renewable Energy Projects: Ogilby Solar (Pacific Solar Investments), pending; Ormesa Complex. Transmission and utility corridor projects.	All American Canal Relining Project, Coachella Canal (maintenance and operation), military activities, mining, Customs and Border Patrol activities (including tactical infrastructure), Mesquite Landfill, Bureau of Reclamation (Drop 2); Interstate 8, State Route 78, and railroad; agricultural activities
Social and Economic	Imperial County	Flow of goods and services; impacts to local services; employment/labor demand; regional economics; user group impacts	All cumulative projects listed in Table 4-1.	

**TABLE 4-2
CUMULATIVE SCENARIO**

Resource or BLM Program	Cumulative Analysis Impact Area	Elements to Consider	BLM Authorized Actions Past, Present & Reasonably Foreseeable	Other Known Actions/Activities Past, Present & Reasonably Foreseeable
Environmental Justice	Imperial County	Impacts to low and minority populations	All cumulative projects listed in Table 4-1.	

4.1.10 Potential Impacts to Resources by Alternative

Impacts to resources would vary by alternative as the amount of surface disturbance in alternatives varies and conservation of natural and cultural resources varies by alternative. Alternatives providing more acreage for OHV recreation, camping, construction activities, as well as geothermal leasing and renewable energy (solar and wind) activities would likely result in greater adverse impacts to resources. Alternatives that provide more acreage for conservation of natural and cultural resources would result in greater beneficial impacts to these resources. Table 4-3 below presents the acres available for geothermal leasing, OHV recreation, and renewable energy development (solar and wind energy), wilderness, and ACECs by alternative. This table will be used to analyze impacts to the various resources by alternative.

**TABLE 4-3
POTENTIAL IMPACTS TO RESOURCES BY ALTERNATIVE (ACRES)**

Designation	Alternative							
	1	2	3	4	5	6	7	8
Mineral Resources—Land Available for Geothermal Leasing (acres)								
Available	188,426	188,426	0	0	11,939	11,939	188,426	35,115
Not Available	0	0	188,426	0	176,894	176,894	0	136,691
Available, but with an NSO stipulation	0	0	0	188,426	0	0	0	14,025
Recreation—OHV Open, Closed, and Limited (acres)								
Open	120,393	87,713	74,676	105,843	103,839	108,914	125,710	127,416
Closed	26,098	75,322	87,778	55,220	58,614	53,539	36,743	35,144
Limited	68,440	51,896	52,477	53,868	52,477	52,477	52,477	52,370
Lands and Realty—Renewable Energy (Solar; acres)								
Available	188,833	188,833	47,131	39,694	39,694	39,694	188,833	27,606
Avoidance	0	0	0	144,290	144,290	144,290	0	0
Excluded	0	0	141,702	4,847	4,847	4,847	0	161,226
Lands and Realty—Renewable Energy (Wind; acres)								
Available	188,833	188,833	47,131	39,694	39,694	39,694	188,833	35,115
Avoidance	0	0	0	144,290	144,290	144,290	0	0
Excluded	0	0	141,702	4,847	4,847	4,847	0	153,717
Special Designations (acres)								
Wilderness	0	26,098	26,098	26,098	26,098	26,098	26,098	26,098
ACECs	32,509	32,509*	6,097	6,097	6,097	6,097	6,097	6,097

*Note: The 32,509 acres includes the North Algodones Dunes ACEC, which overlaps with the North Algodones Dunes Wilderness (26,098 acres)

There is overlap between areas available (or not) for geothermal leasing, solar, wind, and OHV recreation. Figures presented in Chapter 2 depict these areas in more detail.

4.2 Impacts on Air and Atmospheric Values

Certain activities associated with each of the alternatives would result in the emissions of air pollutants in varying amounts. Air emissions generally can be divided into two categories: emissions of criteria pollutants and greenhouse gas emissions. Criteria air pollutants are those that have the potential to affect human health directly. GHG emissions are those that potentially affect global climate. This section assesses the potential air quality emissions (both criteria pollutants and GHG emissions) that may result under each of the alternatives.

4.2.1 Analysis Assumptions

Climate change analyses consider the effects of several factors including GHG emissions, land use management practices, and the albedo effect, among others. The tools necessary to quantify climatic impacts from a particular source of GHG emissions are presently unavailable. As a consequence, impact assessment of specific effects resulting from anthropogenic activities cannot be performed. Therefore, climate change analysis for the purpose of this document is limited to the accounting and disclosing of factors that contribute to climate change, such as GHG emissions. Qualitative and/or quantitative evaluation of potential contributing factors within the Planning Area is included where appropriate and practicable.

The potential direct, indirect, and cumulative effects of the alternatives on the factors that contribute to climate change (GHG emissions) will be analyzed in this document. Some of the GHG emissions associated with each alternative and its activities would be naturally sequestered, while the balance of those emissions would accumulate in the atmosphere. The accumulation of GHG emissions in the atmosphere could contribute to further manifestations of climate change.

4.2.2 Air Quality (Criteria Pollutant Emissions)

Potential adverse impacts to air quality could result from OHV recreation, vehicle emissions, construction and maintenance activities, and mineral extraction activities. Potential beneficial impacts to air quality could result from the implementation of a dust control plan.

The ICAPCD considers recreational use of public lands to be exempt from their rules for fine particulate matter under Rule 800, when the use of such lands is covered by the

most recent BLM dust control plan in compliance with Rule 800. The BLM has developed a *Fugitive Dust Control Plan* to identify sources of PM₁₀ within lands administered by BLM and identify dust control measures that will be implemented to minimize or eliminate emissions (BLM 2006a). A revised plan (June 2011) was developed by BLM and submitted to Imperial County for review (Appendix D). Based on ICAPCD and EPA recommendations, and findings from this EIS, the dust control plan will be reviewed as required and revised as necessary.

A federal action is subject to a full conformity analysis when the total of direct and indirect emissions associated with the action equal or exceed emission rates set forth in 40 CFR Part 93. The threshold (*de minimis*) levels for requiring a full conformity analysis and the amount of emissions that could result in significant impacts are based on the attainment status of each criteria pollutant in the applicable nonattainment areas. These are presented in Table 4-4 below.

**TABLE 4-4
FEDERAL *DE MINIMIS* THRESHOLDS**

Imperial Valley Nonattainment Areas		
Pollutant	Federal Designation	Threshold (tons/year)
Ozone* (VOCs)	Non-Attainment, Moderate	100
Ozone* (NO _x)	Non-Attainment, Moderate	100
PM ₁₀	Non-Attainment, Serious	70
PM _{2.5}	Attainment	N/A
CO	Attainment	N/A

Source of thresholds: 40 CFR 93

*Emission thresholds are given for ozone precursor elements, VOCs and NO_x, based on the attainment status of ozone.

N/A: not applicable

These threshold levels are used to determine the potential significance of activities on BLM-administered lands in the Planning Area.

The predominant source of air pollutants in the Planning Area is OHV activity associated with recreational use of the dunes. The air emissions from these recreation vehicle sources were modeled, and the estimated annual criteria air emissions are summarized in Table 4-5 for each alternative. For comparison, the applicable *de minimis* thresholds are also shown in Table 4-5.

TABLE 4-5
ESTIMATED ANNUAL AIR QUALITY EMISSIONS DUE TO OHV ACTIVITY (TONS/YEAR)

Alternative	VOCs	NO_x	CO	PM₁₀	PM_{2.5}
Baseline (Alternative 2, current condition) OHV emissions (motorcycles, ATVs, 4-wheel drive truck and sand rails) tons/year	152	28.75	1,017.5	100.08	26.41
Alternative 1 OHV emissions	152	28.75	1,017.5	100.08	26.41
Alternative 1 incremental change relative to baseline (Alternative 2)	0	0	0	0	0
Alternative 3 OHV emissions	152	28.75	1,017.5	84.38	22.27
Alternative 3 incremental change relative to baseline (Alternative 2)	0	0	0	-15.3	-4.14
Alternative 4 OHV emissions	152	28.75	1,017.5	98.75	26.06
Alternative 4 incremental change relative to baseline (Alternative 2)	0	0	0	-1.33	-0.35
Alternative 5 OHV emissions	152	28.75	1,017.5	92.37	24.38
Alternative 5 incremental change relative to baseline (Alternative 2)	0	0	0	-7.71	-2.03
Alternative 6 OHV emissions	152	28.75	1,017.5	100.08	26.41
Alternative 6 incremental change relative to baseline (Alternative 2)	0	0	0	0	0
Alternative 7 OHV emissions	152	28.75	1,017.5	100.08	26.41
Alternative 7 incremental change relative to baseline (Alternative 2)	0	0	0	0	0
Alternative 8 OHV emissions	152	28.75	1,017.5	97.57	25.75
Alternative 8 incremental change relative to baseline (Alternative 2)	0	0	0	-2.51	+0.66
Federal Imperial County <i>de minimis</i> thresholds (tons/year)	100	100	N/A	70	N/A

Bold indicates an increase exceeding the *de minimis* threshold.

VOCs = volatile organic compound

NO_x = oxides of nitrogen

PM₁₀ = particulate matter (less than 10 microns)

PM_{2.5} = particulate matter (less than 2.5 microns)

CO = carbon monoxide

Estimated recreational vehicle use of the Planning Area by alternative was obtained from Section 4.18.2—Social and Economic Impacts of Recreation Activities and background parameters (CIC Research 2009), as well as the 2006 visitor profile (Haas and Collins 2008). Based on activity data in the 2006 visitor profile, visitors typically spend an average of 4 hours per day away from their base camp and about 1 hour per day on the dunes off-roading. The average length of stay was 3.1 days. BLM has estimated that visitors traveled 15 miles on their OHVs during their daily activity period. OHV recreational emissions were calculated using the NONROAD model for ATVs, motorcycles, and sand rails (EPA 2006), and the URBEMIS 2007 model for 4-wheel drive trucks (Rimpo and Associates 2008). Based on comments received during public review of the Draft EIS, BLM re-evaluated the fugitive PM₁₀ and PM_{2.5} analyses to assess whether certain conservative assumptions could be relaxed. This re-evaluation

included soil sampling at numerous sites within the Planning Area to determine the soil silt content (generally the greater the silt content, the greater the fugitive particulate emissions resulting from vehicle travel) as well as more travel distribution information within the Planning Area. The particulate matter re-assessment and refinement resulted in a substantial reduction in the projected PM₁₀ and PM_{2.5} emissions associated with each of the alternatives. Overall assumptions used in the modeling effort and the details of the re-assessment are found in Appendix Q. The results are presented in Table 4-5.

Motorcycles and ATV emissions due to operation within the Planning Area were considered to be exhaust emissions and fugitive dust. Emissions in the NONROAD model associated with hose and tank permeation were not included, as these are not isolated to the period of use in the Planning Area. Sand rails were modeled in URBEMIS as non-catalyst (no catalytic converter) automobiles.

Lesser emission-generating activities on BLM-administered lands in the Planning Area include: generator usage; campfires; facility maintenance and construction associated with any future concessions; and non-OHV travel on BLM roads in the Planning Area.

As seen in Table 4-5, the incremental estimated change in emissions generated in the Planning Area under all alternatives is less than the *de minimis* threshold and thus exempt from the conformity determination requirements of the EPA's conformity rule. In addition, the highest estimated emissions within the Planning Area represent approximately 0.1 percent of the total emission inventory of 232.21 tons per day for the air district. A record of non-applicability (RONA) shall be prepared and included as an appendix.

Discretionary construction activities would incorporate BMPs to control dust, as described in Appendix C.

4.2.3 Odors

There are no odor sources in the Planning Area in proximity to sensitive receptors. Campground toilets exist, but are maintained to reduce odors and are located in rural areas.

4.2.4 Climate Change

This section discusses the potential impacts of the alternatives on factors that may contribute to climate change (GHG emissions). Analytical assumptions are described in Section 4.2.1 above.

OHV recreation and other driving activity would generate GHG emissions. The primary GHG for these activities is CO₂. Based on assumptions described in section 4.2.1, visitor use of the Planning Area will remain the same as current levels for all alternatives, and

there would be no incremental change in GHG emissions from the baseline. Overall, GHG emission-generating activities on BLM-administered lands in the Planning Area include: OHV activity, generator usage; campfires; sand and gravel mining; locatable mining, including gold and silver; construction, operation, and maintenance activities related to geothermal, solar, wind, and other development; and facility maintenance and construction associated with any future concessions.

Although the potential effects described above relate to climate resources and GHG emissions, no direct effects of these emissions to localized climate and weather can be identified, as explained in Section 4.2.1 above.

4.2.5 Differences between Alternatives

Under Alternatives 1 and 2, the CDCA Plan would not be amended. Air quality management actions under Alternatives 3 through 8 would not require a CDCA Plan Amendment, but management actions would remain in compliance with the CDCA Plan.

As detailed above, PM₁₀ and PM_{2.5} emissions generated in the Planning Area would be unchanged for Alternative 2, less than the baseline condition under Alternative 3, and greater than the baseline condition for Alternatives 4 through 8.

Under Alternative 3, there would be the potential for campgrounds in the Dunebuggy Flats and Gecko areas to be closed. Such campground closures may result in increased camping in other areas in the vicinity such as Ogilby and Dunes Vista. The Dunes Vista camping area is a significant distance from the actual sand dunes and could generate more dust from OHVs traveling from the camp to the dunes. Riding in the valley floor areas generates more dust than riding on the dunes.

Under Alternatives 3, 4, and 8, potential beneficial impacts to air quality would occur from the reduction or exclusion of the following: lands not available to geothermal leasing; lands available for geothermal leasing but with an NSO stipulation; areas closed to OHV recreation; and avoidance or exclusion areas for solar or wind energy ROW leases. The exclusion of surface-disturbing activities would result in reduced air quality emissions related to construction (geothermal, solar, and wind energy projects) and recreational use (areas closed to OHV recreation). Under Alternative 3, the least number of acres would be available for mineral resource (geothermal) leases (188,426 acres not available for surface occupancy), and the greatest number of acres would be closed to OHV recreation (87,778 acres) and excluded from solar or wind energy project ROW leases (141,702 acres). Under Alternative 4, 188,426 acres would be available to geothermal lease but with an NSO stipulation (no surface disturbance could occur); 144,290 acres would be designated as avoidance areas for solar or wind energy project ROW leases and 4,847 acres as excluded for solar or wind energy projects.

Under Alternative 8, 136,691 acres would not be available and 14,025 acres would be available but with an NSO stipulation for geothermal lease. For solar energy development, 161,226 acres would be excluded and 27,606 acres would be available for project ROW leasing. For wind energy development, 153,717 acres would be excluded and 35,115 acres would be available for project ROW leasing.

Under Alternatives 2 through 8, the North Algodones Dunes Wilderness Area (26,098 acres) would be excluded from motorized use, which would also result in the reduction of air quality impacts.

4.2.6 Irreversible and Irretrievable Commitment of Resources

Implementation of the ISD RAMP would not trigger federal or state conformity levels, and would not cause irreversible or irretrievable commitment of air resources. BMPs and implementation of the dust control plan would minimize impacts related to emissions.

4.2.7 Unavoidable Adverse Impacts

Unavoidable adverse impacts to air quality on BLM-administered lands from OHV recreation would be short- and long-term, and limited to the local region. The intensity of the effects would depend on the season (fall and winter OHV recreation is more intense than spring and summer recreation). Travel along open and limited routes within the Planning Area would result in fugitive dust, an unavoidable short- and long-term impact to air resources.

Renewable energy or geothermal development within areas designated as available for lease or ROW would result in minor to moderate unavoidable impacts to air quality. Impacts from renewable energy and geothermal development would be analyzed on a case-by-case basis for each proposed action, and mitigation measures would be required.

4.2.8 Short-term Use and/or Long-term Productivity

Short-term uses related to recreational activities may result in adverse impacts to air quality. These impacts are not likely to result in adverse impacts in long-term productivity.

4.2.9 Cumulative Impacts

4.2.9.1 Geographic Extent

The existing conditions for air resources in the Planning Area are described in Chapter 3, Section 3.2. The geographic extent for cumulative impacts of air resources is the ICAPCD. In general, actions within the Planning Area are not expected to affect adjacent lands; on the contrary, management actions that avoid or minimize impacts to soil erosion and compaction may also result in the protection of air quality and reduced airborne particles on adjacent lands.

Under all alternatives, within the ICAPCD, continued growth in the surrounding cities (El Centro and Yuma) and communities would likely continue, contributing to air quality issues. Imperial County would continue to enforce regulations and State implementation plans aimed at reaching attainment for air quality standards and improving air quality in the region.

There is potential for an incremental increase of GHG emissions resulting from uses allowed by the management actions that could contribute to cumulative regional and global GHG emissions, primarily from OHV recreation, motorized travel, and development related to geothermal and renewable energy. Overall, under all alternatives, these actions would not likely result in a significant increase of GHG emissions within the Planning Area.

Cumulative impacts would also occur from sources not under BLM management within the Planning Area and vicinity, such as: vehicle emissions from County and State roads (I-8, SR-78, and unsociated traffic on County roads), emissions from heavy truck traffic accessing the Mesquite Regional Landfill, emissions from the UPRR, County and State road maintenance, military and other aircraft, agriculture, and dust generated by natural wind and high wind events.

Geothermal leasing has the potential to contribute to cumulative impacts to air resources. There are currently no geothermal lease applications within the Planning Area or any reasonably foreseeable leases, therefore, no cumulative impacts to air resources from these actions can be anticipated.

Proposed management actions within the ISD Planning Area are likely to have minimal effect on the regional air quality conditions overall. Management actions that may produce emissions are limited in scope and duration (e.g., the majority of OHV recreation occurs during six major holiday weekends in the fall and winter months). The overall undeveloped nature of the Planning Area and vicinity result in minimal contributions to emissions sources. Emissions control measures outlined under the action alternatives would assist in minimizing air quality cumulative impacts. These

measures, along with measures incorporated into present and foreseeable actions, would result in beneficial cumulative impacts to air resources.

4.2.9.2 Reasonably Foreseeable Projects

Table 4.1 provides a list of current and reasonably foreseeable projects, including proposed renewable energy projects, various BLM-authorized actions, and other actions that may be considered. Most projects have either undergone independent environmental review pursuant to NEPA (and in some cases pursuant to the California Environmental Quality Act) or will do so prior to approval. The reasonably foreseeable projects that may affect air quality are listed in Table 4.1.

4.2.9.3 Cumulative Impact Differences between Alternatives

Vehicle emissions and recreational activities resulting in PM₁₀ and PM_{2.5} emissions in the Planning Area contribute to adverse impacts to air quality within and surrounding the Planning Area. Under Alternatives 2 and 3, the highest number of acres would be closed to OHV recreation; under these alternatives, impacts to air quality would be lowest. Under Alternatives 1, 4, 5, 6, 7, and 8, impacts from recreation would be similar overall and greater than under Alternatives 2 and 3 (see Table 4-5). Recreational activities would be reasonably foreseeable to continue within all areas open to OHV recreation, combined with other present and foreseeable future projects, these activities would result in minor to moderate (depending on the season) cumulative impacts to air resources.

Impacts from solar and wind energy development would be lowest under Alternatives 3 and 8, which propose the least acres available for wind and solar development within the Planning Area. Impacts would be similar under Alternatives 1, 2, 4, 5, 6, and 7, with varying amounts of acres available or with N SO stipulations for wind and solar development, resulting in a greater potential for cumulative impacts to air resources (see Table 4-3).

Law enforcement or emergency search and rescue activities, including USBP activities, would continue to result in fugitive dust emissions, which would be a cumulative impact. These cumulative impacts would be similar for all alternatives.

4.2.10 Mitigation Measures

Mitigation measures and BMPs related to air resources outlined under all action alternatives in Chapter 2 (Section 2.3.3) would assist in minimizing fugitive dust emissions. These measures, along with measures incorporated into present and foreseeable actions, would minimize and mitigate impacts to air resources.

4.3 Impacts on Soil Resources

Soils within the Planning Area, which consist primarily of sands, are susceptible to impacts from compaction and erosion. Both beneficial and adverse impacts to these soil resources could occur from land use authorizations (including ROWs, leases, and development), mineral/mining development, and OHV recreation. Soils within the Planning Area would be susceptible to impacts from compaction, disturbance, and invasion by non-native plant species.

Under all alternatives, impacts would be avoided or minimized to the maximum extent possible by management actions and BMP.

4.3.1 Impacts Resulting in Compaction and Erosion

Compaction has the potential to occur from camping, OHV recreation, and construction activities (e.g., ROW facilities and new access roads, recreational facilities, mining activities, and wildlife waters). While compaction would not be a high risk in the deep sand environment, some of the soils in the microphyll woodland and creosote scrub communities could be more susceptible to compaction. Concentrated visitor use, designated camping, and high-use OHV areas would result in increased soil compaction, which in turn could limit soil productivity.

Erosion has the potential to occur from motorized recreation of unpaved routes and dunes. Construction activities (e.g., facilities and new access roads, recreational facilities, and mining activities) usually result in removal of vegetation, increasing erosion potential.

Geothermal energy development can include multiple production and injection wells installed on pads that vary from 1 to 5 acres in size. Although they require less land for the plant itself, water-cooled geothermal systems need a continuous supply of water and create vapor plumes. Pipelines are constructed above ground, on supports, to transport geothermal fluids. Geothermal facilities can also include fencing, off-site access roads and transmission lines, ancillary buildings, water storage and discharge facilities, as well as drilling rigs or derricks and associated support facilities (Office of Indian Energy and Economic Development 2009a). Impacts to soil resources from geothermal energy development could include both compaction and erosion.

The effect of OHV recreation on sand dunes in the Planning Area has been discussed by Norris (1995) and is characterized primarily by increased erosion and the creation of vehicle tracks. Although the visual effects of the OHV tracks may dissipate after a windstorm, the vehicle impacts on erosion of the mobile sand dunes have a longer lasting effect. The loss of vegetation due to OHV trampling and erosion from vehicle tracks result in reduced habitat availability for wildlife and insect species. These lasting

impacts could be repaired naturally over the span of several years, if no further vehicle activities occur in the impacted area.

Unvegetated or sparsely vegetated dunes are for the most part active, dynamic systems that would fairly promptly re-establish their pristine form if left relatively undisturbed and if the sources of sand were not adversely affected in some way. Relict or vegetated dunes would take longer to recover their original character than mobile, active dunes. Better developed soils and stable surfaces within the Planning Area, particularly those of the distal portions of the alluvial fans extending into the Planning Area from the east, would take longer to regain their natural aspect than dunes soils. In these areas of more stable surfaces, soil compaction would also be an effect of OHV recreation. Evidence would suggest that some of these gravelly, stable surfaces might not regain their predisturbance character for centuries (Steiger and Webb 2000).

Utility-scale solar energy development can include commitment of a large land area for both photovoltaic (PV) and concentrating solar power (CSP) systems. This land area would be used for the solar systems themselves (whether PV or CSP), as well as ancillary buildings, water storage and discharge facilities, fencing, access roads, and off-site facilities such as a central power management facility with transmission and grid connections. The land disturbance would be greater for PV (9 acres per MW versus 5 acres per MW for CSP) due to the interconnectedness of the blocks of solar arrays and the lower efficiency rates. However, water use would be considerably greater for CSP, as PV uses minimal water (Office of Indian Energy and Economic Development 2009b). As with solar energy development, wind energy development can include commitment of a large land area. This land area would be used for the wind turbines themselves (which can range from 200 to 300 feet in height), as well as ancillary facilities, fencing, access roads, and a central power management facility with transmission and grid connections (Office of Indian Energy and Economic Development 2009c). Impacts to soil resources from solar and wind energy development could include both compaction and erosion.

4.3.2 Differences between Alternatives

Under Alternatives 1 and 2, the CDCA Plan would not be amended. Soil resources management actions under Alternatives 3 through 8 would not require a CDCA Plan Amendment, but management actions would remain in compliance with the CDCA Plan.

Impacts to soil resources from geothermal leasing under mineral resources would vary by alternative. Geothermal leasing would adversely impact the least amount of soil resources under Alternatives 3 and 4. Under Alternative 3, no acres within the planning area would be available for geothermal leasing and under Alternative 4, 188,426 acres would be available but with an NSO stipulation. Under Alternatives 1, 2, and 7, 188,426 acres would be available for geothermal leasing, resulting in greater potential adverse impacts to soil resources. Under these alternatives, there would be increased acreages

of lost soil productivity within the Planning Area (see Table 4-3). Under Alternatives 5 and 6, 11,939 acres would be available for geothermal leasing, resulting in low to moderate potential adverse impacts to soil resources as compared to Alternatives 1, 2, and 7. Under Alternative 8, moderate adverse impacts to soil resource would likely occur as 35,115 acres would be available for geothermal leasing.

OHV area designations would adversely impact soils the least under Alternatives 2 and 3. Under these alternatives, the fewest number of acres open to OHV recreation (87,713 and 74,676 respectively) and highest number of closed acres (75,322 and 87,778 respectively) occur. Motorized travel would not be authorized within proposed closed OHV management areas, and additional soil erosion and compaction from OHV recreation would no longer occur. Under Alternatives 4, 5, and 6, adverse impacts to soil resources would be greater than under Alternatives 2 and 3, but less than under Alternatives 1, 7, and 8. Under Alternatives 1, 7, and 8 there would be increased acreages open to OHV recreation (120,393, 125,710, and 127,416, respectively) resulting in the most acres of potentially lost soil productivity within the Planning Area (see Table 4-3).

Adverse impacts to soil resources from solar and wind development would be the lowest under Alternatives 3 and 8, which propose 47,131 and 27,606 acres, respectively, within the Planning Area available for solar development, and 47,131 and 35,115, respectively, for wind development. Under Alternatives 4, 5, and 6, adverse impacts to soil resources would be greater than under Alternatives 3 and 8 as these alternatives propose 39,694 acres available and 144,290 acres as avoidance for solar and wind development. An avoidance area is defined as an area to be avoided but may be available for location of right-of-ways with special stipulations. Under Alternatives 1, 2, and 7, lands available for solar and wind development would increase (188,833 acres available) and, in turn, potential adverse impacts to soil resources would be greater. Under these alternatives, there would be increased acreages of lost soil productivity within the Planning Area (see Table 4-3).

Under Alternatives 3, 4, and 8, potential beneficial impacts to soil resources would occur from the reduction or exclusion of the following activities: lands not available to geothermal leasing; lands available for geothermal leasing but with an NSO stipulation; areas closed to OHV recreation; and avoidance or exclusion areas for solar or wind energy ROW leases. The exclusion of surface-disturbing activities would result in reduced soil erosion and compaction related to construction (geothermal, solar, and wind energy projects) and recreational uses (areas closed to OHV recreation). Under Alternative 3, the least number of acres would be available for mineral resource (geothermal) leases (188,426 acres not available for surface occupancy), and the greatest number of acres would be closed to OHV recreation (87,778 acres) and excluded from solar or wind energy project ROW leases (141,702 acres). Under Alternative 4, 188,426 acres would be available to geothermal lease, but with an NSO

stipulation (no surface disturbance could occur); 144,290 acres would be designated as avoidance areas for solar or wind energy project ROW leases and 4,847 acres as excluded for solar or wind energy projects. Under Alternative 8, 136,691 acres would not be available, 14,025 acres would be available but with an NSO stipulation for geothermal lease, and 161,226 and 153,717 acres, respectively, would be excluded from solar or wind energy project ROW leasing. Under Alternatives 2 through 8, the North Algodones Dunes Wilderness (26,098 acres) would continue to be excluded from motorized use, which would also result in the reduction of soil erosion and compaction.

4.3.3 Irreversible and Irretrievable Commitment of Resources

Implementation of the Proposed RAMP/CDCA Plan Amendment may result in surface-disturbing activities (e.g., mineral, energy, ROWs, and recreational activities) that would cause irreversible or irretrievable commitment of soil resources. Surface-disturbing activities may irreversibly alter soils, while also resulting in sediment, salinity, and nonpoint source pollution.

4.3.4 Unavoidable Adverse Impacts

Unavoidable adverse impacts to soil resources on BLM-administered lands from OHV recreation within open and limited use areas would be short-term and consist of soil compaction and erosion. The intensity of the effects would depend on the season (fall and winter OHV recreation is more intense than spring and summer recreation).

Geothermal and renewable energy development within the Planning Area (Table 4-2) would result in long-term unavoidable impacts to soil resources. Mitigation measures to minimize these impacts would be required; however, permanent impacts to soil resources would occur. Project-level analysis would be required on a case-by-case basis for any proposed projects.

BLM law enforcement or emergency search and rescue activities could also result in soil compaction and erosion, which would also be a short-term unavoidable adverse impact. Under all alternatives, impacts would be minimized to the maximum extent possible by management actions and BMPs.

4.3.5 Short-term Use and/or Long-term Productivity

Vegetated areas converted to permanent facilities or structures would result in a net loss of soils as well as the potential increase in erosion. Development of structures would likely result in loss of long-term productivity to soil resources. Mitigation measures to minimize these impacts would be required; however, permanent impacts to soil resources would occur.

4.3.6 Cumulative Impacts

4.3.6.1 Geographic Extent

The geographic extent for cumulative impacts to soil resources is the Planning Area. The existing condition for soil resources in the Planning Area, which represents the aggregate effect of past and present actions impacting soil resources, is described in Chapter 3, Section 3.3. In general, management actions within the Planning Area are not expected to affect adjacent lands; on the contrary, management actions that avoid or minimize impacts to soils (soil erosion and compaction) may also result in the reduction of soil erosion as well as the protection of air quality and reduced airborne particles on adjacent lands. Activities occurring on lands adjacent to the Planning Area (e.g., recreation, energy transmission and development, military training, and agricultural activities) have had minimal impacts to soils within the Planning Area, and these ongoing activities would likely continue to have minimal impacts to soil resources.

Existing impacts to soil resources include compaction and erosion from recreational activities, motorized travel, facilities, and other development actions. Currently, multiple applications for geothermal lease, and renewable energy and transmission ROWs have been submitted to BLM for areas within and adjacent to the Planning Area (see Table 4-2). At this time, the number of acres of potential disturbance from these applications is unknown as many have not finalized Plans of Development or been approved by BLM.

Cumulative impacts to soil resources within the Planning Area are likely to increase as a result of the increased demand for renewable energy such as geothermal, and solar and wind developments. The cumulative effects of energy development, transmission, and storage are likely to increase throughout the life of the plan. As the growing population of the West demands more energy, the BLM would continue to accommodate these needs where practicable.

4.3.6.2 Reasonably Foreseeable Projects

Table 4.1 provides a list of current and reasonably foreseeable projects, including proposed renewable energy projects, various BLM-authorized actions, and other actions that may be considered. Most projects have either undergone independent environmental review pursuant to NEPA (and in some cases pursuant to the California Environmental Quality Act) or will do so prior to approval. The reasonably foreseeable projects that may affect soil resources are listed in Table 4.1.

4.3.6.3 Cumulative Impact Differences between Alternatives

Potential impacts from lands available for geothermal leasing would be least under Alternatives 3 and 4. Under these alternatives, either no acres would be available for

geothermal development or NSO stipulations would apply. Therefore, these alternatives, combined with other present and reasonably foreseeable future projects, would not contribute to potential cumulative impacts of geothermal leasing on soil resources.

Potential impacts would be similar under Alternatives 1, 2, 5, 6, 7 and 8 with varying amounts of acres available for geothermal development, resulting in a greater potential for impacts to soil resources (see Table 4-3). Under Alternatives 1, 2, and 7, 188,462 acres would be available for geothermal leasing. Under Alternatives 5 and 6, 11,939 acres would be available for geothermal leasing. Under Alternative 8, 35,115 acres would be available for geothermal leasing. Geothermal leasing has the potential to contribute to cumulative impacts to soil resources. However, there are currently no geothermal lease applications within the Planning Area and there are no reasonably foreseeable leases, therefore, no cumulative impacts to soil resources from these actions can be anticipated.

The past and present development and public use of recreational sites in the Planning Area have compacted and denuded significant soil resources, causing long-term erosion, sedimentation, decreased vegetative diversity, and loss of habitat productivity (see direct and indirect impacts analysis in Section 4.3.1). Open camping and firewood collection has led to diminished organic soil matter, decreased vegetative vigor, soil compaction in roads and campsites, and increased wind and water erosion rates. Under Alternatives 2 and 3, the most acres would be closed to OHV recreation. Under these alternatives, impacts would be the lowest. Under Alternatives 1, 4, 5, 6, 7, and 8, impacts from recreation would be similar overall among themselves and greater than under Alternatives 2 and 3 (see Table 4-3). Recreational activities would be reasonably foreseeable to continue within all areas open to OHV recreation, resulting in moderate cumulative impacts to soil resources.

Impacts from solar and wind energy development would be lowest under Alternatives 3 and 8, which propose the least acres available for wind and solar development within the Planning Area. Impacts under Alternatives 1, 2, 4, 5, 6, and 7 would be similar among themselves, with varying amounts of acres available or with NSO stipulations for wind and solar development and resulting in a greater potential for cumulative impacts to soil resources (see Table 4-3).

Cumulative impacts from law enforcement or emergency search and rescue activities, including USBP activities, would continue to result in soil compaction and erosion, which would be a cumulative impact. These impacts would be similar for all alternatives.

4.3.7 Mitigation Measures

Mitigation measures and BMPs related to soil resources outlined under all action alternatives in Chapter 2 (Section 2.3.4) would assist in minimizing soil erosion and

compaction. These measures, along with measures incorporated into present and foreseeable actions, would be used to avoid, minimize, and mitigate impacts to soil resources.

4.4 Impacts on Water Resources

The primary impacts to water resources in the Planning Area would be to ground water. Impacts on ground water are discussed in terms of water quality (dissolved solids and chemical/inorganic and microorganism composition) and quantity.

The assessment of impacts assumes that implementation of the proposed alternatives would include measures required by federal, state, or local law and/or regulation, when applicable. The proposed alternatives would have an adverse impact on water resources if they:

- substantially degrade water quality
- contaminate a public water supply
- cause substantial flooding or siltation
- substantially alter surface flow conditions, patterns, or rates
- result in water demands that would outstrip supply

Maintenance and installation of restroom facilities and garbage receptacles would likely have beneficial long-term impacts on water resources by reducing the effects of visitor use on surface and groundwater quality.

Construction activities, mineral extraction activities, wildlife improvements, and recreational facility improvements that would rely on well water could increase the demands on groundwater.

Surface-disturbing activities within the watershed could impact the natural flows of washes or affect infiltration into the groundwater system. Restoration of disturbed sites may reduce the amount of siltation into the surface water as erosion may be reduced.

Shallow aquifers in the Planning Area could be impacted by construction activities associated with ROWs and other land use authorizations. These potential impacts include changes in overland flow and recharge caused by clearing and grading in construction areas (FERC and California State Lands Commission 2007).

The quality of groundwater could be affected by illegal dumping or accidental spills.

Geothermal development can include multiple production and injection wells installed on pads that vary from 1 to 5 acres in size. Although they require less land for the plant itself, water-cooled geothermal systems need a continuous supply of water and create vapor plumes. Pipelines are constructed above ground, on supports, to transport geothermal fluids. Geothermal facilities can also include fencing, off-site access roads and transmission lines, ancillary buildings, water storage and discharge facilities, as well as drilling rigs or derricks and associated support facilities (Office of Indian Energy and Economic Development 2009a). Impacts associated with geothermal development could include increased demands on groundwater or degradation of infiltration and natural flows due to siltation.

Utility-scale solar energy development can include commitment of a large land area for both PV and CSP systems. This land area would be used for the solar systems themselves (whether PV or CSP), as well as ancillary buildings, water storage and discharge facilities, fencing, access roads, and off-site facilities such as a central power management facility with transmission and grid connections. The land disturbance would be greater for PV (9 acres per MW versus 5 acres per MW for CSP) due to the interconnectedness of the blocks of solar arrays and the lower efficiency rates. However, water use would be considerably greater for CSP, as PV uses minimal water (Office of Indian Energy and Economic Development 2009b). Impacts associated with solar energy development could include increased demands on groundwater or degradation of groundwater due to accidental spills.

4.4.1 Differences between Alternatives

Under Alternatives 1 and 2, the CDCA Plan would not be amended. Water resources management actions under Alternatives 3 through 8 would not require a CDCA Plan Amendment, management actions would remain in compliance with the CDCA Plan.

Differences in impacts to groundwater resources would potentially vary by alternative as the amount of surface disturbance varies. Alternatives providing more acreage for OHV recreation, camping, construction activities, as well as renewable energy and geothermal development activities would result in greater adverse impacts (see Table 4-3). Differences in impacts to groundwater resources by alternative would be similar to those outlined in Section 4.3.2 for Soil Resources above.

4.4.2 Irreversible and Irretrievable Commitment of Resources

Implementation of the Proposed RAMP/CDCA Plan Amendment may result in impacts to water resources. Surface-disturbing activities within the watershed could impact the natural flows of washes or affect infiltration into the groundwater system resulting in changes in overland flow and recharge caused by clearing and grading in construction

areas. These impacts could cause an irreversible and irretrievable commitment of resources.

4.4.3 Unavoidable Adverse Impacts

There would be no unavoidable adverse impacts to water resources resulting from implementing the Proposed RAMP/CDCA Plan Amendment.

4.4.4 Short-term Use and/or Long-term Productivity

There would not likely be short-term uses of water resources that would impact long-term productivity of the resource.

4.4.5 Cumulative Impacts

4.4.5.1 Geographic Extent

The geographic extent for cumulative impacts to water resources includes the Imperial Valley groundwater basin and the Anasazi-Ogilby-East Mesa groundwater basin. The existing condition for water resources in the Planning Area, which represents the aggregate effect of past and present actions impacting water resources, is described in Chapter 3, Section 3.4. In general, actions within the Planning Area are not expected to affect adjacent lands; on the contrary, management actions that avoid or minimize impacts to water resources within the assessment area may also result in the protection of resources on adjacent lands. Activities occurring on lands adjacent to the Planning Area (e.g., recreation, energy transmission and development, military training, and agricultural activities) have had minimal impacts to water resources within the Planning Area, and these ongoing activities would likely continue to have minimal impacts.

Cumulative impacts to water resources resulting from increased recreational use, demand for natural resources, and other activities within and surrounding the Planning Area would continue and are likely to increase in the future. Because municipalities and water districts are the major water users within the region, there would be negligible differences in cumulative impacts to water resources from BLM actions proposed by any alternative. Water resources on public lands may be affected by off-site use, recreational activities, development, and industrial (e.g., mining or landfill) uses regardless of the alternative selected.

The BOR is the federal agency charged with regulating the delivery of the lower Colorado River (All-American and Coachella canals) water to farmers, municipalities, Mexico, and other water users in the region. Reclamation projects, such as the Drop 2 Reservoir Project in Imperial County, California, could potentially reduce groundwater levels in the Planning Area (see Table 4-2). As population growth and water demands in

the region continue to increase, cumulative impacts to water resources from similar types of activities within and adjacent to the Planning Area would likely increase.

4.4.5.2 Reasonably Foreseeable Projects

Table 4.1 provides a list of current and reasonably foreseeable projects, including proposed renewable energy projects, various BLM-authorized actions, and other actions that may be considered. Most projects have either undergone independent environmental review pursuant to NEPA (and in some cases pursuant to the California Environmental Quality Act) or will do so prior to approval. The reasonably foreseeable projects that may affect water resources are listed in Table 4.1.

4.4.5.3 Cumulative Impact Differences between Alternatives

Although alternatives vary in the number of acres available for surface disturbance activities and recreational use; overall, impacts to water resources, particularly ground water, from the LSD RAMP combined with other present and reasonably foreseeable future projects, would be similar under all alternatives. Cumulative impacts are likely to remain negligible to minor overall. All proposed projects would be analyzed on a case-by-case basis and would be required to include mitigation measures and BMPs to avoid and minimize potential impacts to water resources.

4.4.6 Mitigation Measures

Mitigation measures and BMPs related to water resources outlined under all action alternatives in Chapter 2 (Section 2.3.5) would assist in minimizing any impacts. These measures, along with measures incorporated into present and foreseeable actions, would avoid, minimize, and mitigate impacts to water resources within the Planning Area.

4.5 Impacts on Vegetative Resources

Impacts could occur to terrestrial vegetation, priority plant species, and desired plant communities from the following: 1) direct loss of vegetative resource; 2) increase in non-native invasive species; and 3) change in cover species composition and structure, including density and vegetation.

The desired plant communities on BLM-administered lands within the Planning Area are creosote bush scrub, psammophytic scrub, and microphyll woodland. These habitat types would not be impacted by OHV recreation within the North Angeles Dunes Wilderness, which is closed to OHV recreation.

Some BLM land use plan decisions and authorized activities would be beneficial through vegetation protection and enhancement (e.g., habitat restoration), while others would be adverse by authorizing discretionary activities that could result in detrimental effects to vegetation.

Native terrestrial vegetation loss would be temporary or permanent based on the size and scale of the surface-disturbing activity and could include, but is not limited to, mineral resource activities (geothermal development), recreational use, construction of new recreational facilities, road building, renewable energy development (solar and wind), and construction/maintenance of ROWs.

Temporary losses are impacts from construction or other surface-disturbing activities that would recover post-activity. Permanent losses would include conversion of vegetation from construction of permanent facilities and structures. Vegetation loss would be minimal in the wilderness and ACECs, which are designated to protect sensitive resource values. Exclusion and avoidance areas would help to direct projects into areas that would have reduced impact on vegetation resources.

Impacts to native terrestrial vegetation could include both degradation and enhancement depending on the activities or decisions implemented. Degradation could be caused by activities that would change vegetative composition or structure. Enhancement could be caused by activities (e.g., vegetative management) that result in the restoration of a desirable native vegetative composition and improved seeding, germination, growth, and recruitment. Some of the vegetative management activities (e.g., non-native invasive plant species removal, mechanical vegetation removal) would result in temporary degradation to terrestrial vegetation, but the overall result would be enhancement of vegetative quality due to restoration of natural ecosystem function.

Geothermal development can include multiple production and injection wells installed on pads that vary from 1 to 5 acres in size. Although they require less land for the plant itself, water-cooled geothermal systems need a continuous supply of water and create vapor plumes. Pipelines are constructed above ground, on supports, to transport geothermal fluids. Geothermal facilities can also include fencing, off-site access roads and transmission lines, ancillary buildings, water storage and discharge facilities, as well as drilling rigs or derricks and associated support facilities (Office of Indian Energy and Economic Development 2009a). Geothermal energy development within the Planning Area could result in destruction of vegetation and vegetation communities, and introduction and spread of invasive plant species.

OHV recreation could result in destruction of vegetation along areas where vehicles are allowed to travel (open OHV management areas). OHV recreation could also cause soil compaction, which would reduce seeding and germination in these areas.

OHV recreation and other surface-disturbing activities could promote the spread of invasive plant species by denuding native plant cover and discouraging native plant development. Equipment used during construction activities could introduce non-native invasive species.

Utility-scale solar energy development can include commitment of a large land area for both PV and CSP systems. This land area would be used for the solar systems themselves (whether PV or CSP) as well as ancillary buildings, water storage and discharge facilities, fencing, access roads, and off-site facilities such as a central power management facility with transmission and grid connections. The land disturbance would be greater for PV (9 acres per MW versus 5 acres per MW for CSP) due to the interconnectedness of the blocks of solar arrays and the lower efficiency rates. However, water use would be considerably greater for CSP, as PV uses minimal water (Office of Indian Energy and Economic Development 2009b). As with solar energy development, wind energy development can include commitment of a large land area. This land area would be used for the wind turbines themselves (which can range from 200 to 300 feet in height), as well as ancillary facilities, fencing, access roads, and a central power management facility with transmission and grid connections (Office of Indian Energy and Economic Development 2009c). Solar and wind energy development within the Planning Area could result in destruction of vegetation and vegetation communities, and introduction and spread of invasive plant species.

4.5.1 Insect Species

Maintaining natural vegetation is vital to preserving native insects; therefore, impacts to insect species within the Planning Area are described under vegetation resource impacts because of their close association. Available data on insect species within the ISD indicate that human impacts on woody perennial plant populations appear to have the most immediate impact on the majority of endemic insect species, as these woody plants are either the primary food source or are the food source for host or prey species. Current areas of high OHV recreation have different insect assemblages, which is likely due to changes in vegetation type and cover in these recreational areas. The presence of large numbers of visitors seems to primarily impact some of the endemic beetle species, whose spring adult activity coincides with several high visitor use weekends (see Appendix I). Results of transects conducted within the Planning Area demonstrated that OHV recreation had severe negative impacts on Coleoptera (beetle species) that inhabit these sand dunes (Van Dam and Van Dam 2008).

4.5.2 Differences between Alternatives

Under Alternatives 1 and 2, the CDCA Plan would not be amended. Table 4-6 presents the CDCA Plan Amendments for vegetative resources by alternative.

TABLE 4-6
CDCA PLAN AMENDMENTS FOR VEGETATION RESOURCES BY ALTERNATIVE

Management Actions	1	2	3	4	5	6	7	8
Classify microphyll woodlands as avoidance areas ¹ for all commercial and non-commercial surface-disturbing activities.	n/a	n/a		X	X	X		X
Classify microphyll woodlands as exclusion areas ¹ for all commercial and non-commercial surface-disturbing activities.	n/a	n/a	X					
Exclude microphyll woodlands south of Wash 20 from OHV recreation.	n/a	n/a	X	X	X			
Allow OHV recreation in a portion of the microphyll woodlands south of Wash 33.	n/a	n/a				X	X	
Allow OHV recreation and prohibit camping in microphyll woodlands south of Wash 33 and north of Wash 70.	n/a	n/a						X

¹Avoidance areas are defined in the BLM Land Use Planning Handbook as areas to be avoided but which may be available for location rights-of-way with special stipulations. Exclusion areas are defined as areas which are not available for location of rights-of-way under any conditions

Impacts to vegetation resources, including priority plant species, from geothermal development would vary by alternative. Geothermal development would adversely impact the fewest acres, and therefore vegetation resources as well as insect populations, under Alternatives 3 and 4. Under Alternatives 5 and 6, 11,939 acres would be available for geothermal leasing and under Alternative 8, 35,115 acres would be available for geothermal leasing. Under these alternatives, moderate adverse impacts to vegetation resources and insect populations would occur as compared to Alternatives 3 and 4. Under Alternatives 1, 2, and 7, lands available for geothermal development would be the greatest (188,426 acres) and, in turn, potential adverse impacts to vegetation resources and insect populations would be greater. Under these alternatives, there would be increased potential for the loss of vegetative resources and insect populations due to geothermal construction and development activities within the Planning Area (see Table 4-3).

OHV area designations would adversely impact vegetation resources (including priority plant species) and insect populations, the least under Alternatives 2 and 3 (Table 4-6). The greatest number of acres closed or limited to OHV recreation is found under these alternatives. Motorized travel would not be authorized within proposed closed OHV management areas, and vegetative loss from OHV recreation would no longer occur. Under Alternatives 4, 5, and 6, adverse impacts to vegetation resources and insect populations would be greater than under Alternatives 2 and 3 but less than under Alternatives 1, 7, and 8. Under Alternatives 1, 7, and 8 there would be increased acreages open to OHV recreation resulting in an increased number of acres of potentially lost or disturbed vegetation and insect populations within the Planning Area (Table 4-7).

**TABLE 4-7
VEGETATION COMMUNITIES WITHIN OPEN/CLOSED/LIMITED OHV RECREATION BY
ALTERNATIVE (ACRES)**

Vegetation Community	Alternative							
	1	2	3	4	5	6	7	8
Open OHV (acres)								
Creosote Bush Scrub	18,041	22,116	21,866	21,878	22,642	22,964	28,867	28,974
Psammophytic Scrub	84,592	51,727	41,076	70,891	67,501	70,020	77,439	79,038
Microphyll Woodland	13,603	9,827	7,577	8,816	9,539	11,772	15,247	15,246
Closed OHV (acres)								
Creosote Bush Scrub	4,515	11,806	11,517	11,504	10,741	10,418	4,515	4,515
Psammophytic Scrub	14,897	51,254	61,905	30,700	35,481	32,961	25,542	23,943
Microphyll Woodland	6,685	12,146	14,355	13,016	12,393	10,160	6,685	6,686
Limited OHV (acres)								
Creosote Bush Scrub	58,425	47,059	47,599	47,599	47,599	47,599	47,599	47,492
Psammophytic Scrub	6,758	3,266	3,266	4,656	3,266	3,266	3,266	3,266
Microphyll Woodland	1,703	18	60	60	60	60	60	60

Adverse impacts to vegetation resources (including priority plant species) and insect populations from solar and wind leasing would be lowest under Alternatives 3 and 8. Under Alternatives 4, 5, and 6, adverse impacts to vegetation resources and insect populations would be greater than under Alternatives 3 and 8 but less than under Alternatives 1, 2, and 7. Under Alternatives 4, 5, and 6 there would be 144,290 acres of land designated as avoidance areas. Under Alternatives 1, 2, and 7, lands available for solar and wind leasing would increase and, in turn, potential adverse impacts to vegetation resources and insect populations would be greater. Under these alternatives, there would be increased acreages of construction and development for solar and wind sites within the Planning Area (see Table 4-3).

Under Alternatives 3, 4, and 8, potential beneficial impacts to vegetative resources and insect populations would occur from the reduction or exclusion of the following: lands not available to geothermal leasing; available for geothermal leasing but with an NSO stipulation; areas closed to OHV recreation; and, avoidance or exclusion areas for solar or wind energy ROW leases. The exclusion of surface-disturbing activities would result in the elimination disturbance and loss of vegetative resources and insect populations from construction (geothermal, solar, and wind energy projects) and recreational use (areas closed to OHV recreation). Under Alternative 3, the least number of acres would

be available for mineral resource (geothermal) leases (188,426 acres not available for surface occupancy), and the greatest number of acres would be closed to OHV recreation (87,778 acres) and excluded from solar or wind energy project ROW leases (141,702 acres). Under Alternative 4, 188,426 acres would be available to geothermal lease, but with an NSO stipulation (no surface disturbance could occur); 144,290 acres would be designated as avoidance areas for solar or wind energy project ROW leases; and 4,847 acres would be designated as excluded for solar or wind energy projects. Under Alternative 8, 136,691 acres would not be available; 14,025 acres would be available but with an NSO stipulation for geothermal lease; and 161,226 and 153,717 acres, respectively, would be excluded from solar or wind energy project ROW leasing.

Under Alternatives 2 through 8, the North Algodones Dunes Wilderness (26,098 acres) would continue to be excluded from motorized use. Under all alternatives, no wood collection would be allowed within ACECs (6,097 acres), and restoration treatments would be performed in areas where damage has occurred or where vehicle incursions have occurred. Under all alternatives, the East Mesa ACEC would be designated as Limited OHV use (limited to designated routes of travel only). This designation would result in the protection of vegetative resources and insect populations outside of designated routes.

Under Alternatives 4, 5, 6, and 8, the microphyll woodlands would be classified as an avoidance area, which is defined as an area to be avoided but may be available for location of right-of-ways with special stipulations. Under this classification, the microphyll woodlands would be an avoidance area for all commercial and non-commercial surface-disturbing activities. Avoidance areas under these alternatives would reduce potential disturbance to vegetation resources and insect populations within the microphyll woodlands and result in beneficial effects.

Under Alternative 3, the microphyll woodlands would be classified as an exclusion area, which is defined as an area which is not available for location of right-of-ways under any conditions. Under this alternative, the microphyll woodlands would be excluded for all commercial and non-commercial surface-disturbing activities. The microphyll woodlands exclusion area under Alternative 3 would eliminate potential disturbance to vegetation resources and insect populations within the microphyll woodlands and result in beneficial effects.

Under Alternatives 3, 4, and 5, the microphyll woodlands south of Wash 20 would be closed to OHV recreation. Under these alternatives, the exclusion of OHV recreation would result in reduced impacts from recreational activities on vegetation within the microphyll woodlands, a beneficial effect to the resources. Under Alternatives 1, 2, 6, and 7, a portion of the microphyll woodlands south of Wash 20 would be open to OHV recreation, increasing potential adverse impacts from recreational activities.

Under Alternative 8, the microphyll woodlands would be open to OHV recreation but camping (of all types) would be prohibited within the microphyll woodlands south of Wash 44 and north of Wash 70. Under this alternative, potential OHV recreational impacts would likely occur; however, the elimination of camping would result in reduced impacts to vegetation and insect populations within the microphyll woodlands due to fire wood collection, fire danger, trampling of vegetation, and surface disturbance, resulting in a beneficial effect.

4.5.3 Irreversible and Irretrievable Commitment of Resources

Implementation of the Proposed RAMP/CDCA Plan Amendment may result in surface-disturbing activities (e.g., mineral, energy, ROWs, and recreational activities) that would cause irreversible or irretrievable commitment of vegetation resources. Surface-disturbing activities may irreversibly alter soils, while also resulting in the loss of vegetation and habitat.

4.5.4 Unavoidable Adverse Impacts

Proposed renewable energy development within the Planning Area (see Table 4-2) would result in long-term unavoidable impacts to vegetative resources and insect populations. Mitigation measures to minimize these impacts would be required; however, permanent loss of vegetation and insect populations would occur. Project-level analyses would be required on a case-by-case basis for all proposed projects.

BLM law enforcement or emergency search and rescue activities occurring in areas supporting priority plant species and desired plant communities could result in unavoidable adverse impacts to these resources.

4.5.5 Short-term Use and/or Long-term Productivity

Vegetated areas converted to permanent facilities or structures would result in a net loss of vegetation as well as insect populations as long as those facilities or structures remain. Development of structures would likely result in loss of long-term productivity to vegetation resources. Mitigation measures to minimize these impacts would be required; however, permanent impacts to vegetation resources would occur.

4.5.6 Cumulative Impacts

4.5.6.1 Geographic Extent

The geographic extent for cumulative impacts to vegetation is the Planning Area. Impacts to vegetation resources result in corresponding impacts to insect species within the Planning Area, therefore, impacts to insects are included in this discussion. The existing condition for vegetative resources in the Planning Area, which represents the aggregate effect of past and present actions impacting vegetation resources, is described in Chapter 3, Section 3.5. In general, actions within the Planning Area are not expected to affect adjacent lands; however, management actions that avoid or minimize impacts to soils (soil erosion and compaction) and vegetation resources may also result in the protection of soils and vegetation communities on adjacent lands.

Vegetation and associated insect resources on public lands may be affected by off-site use and development under all alternatives, including the Proposed Plan and CDCA Plan A amendment. Impacts affecting soil resources would also affect vegetation resources within the Planning Area.

Direct impacts of OHV recreation or cross-country travel have been well documented and include destruction of soil stabilizers, soil compaction, reduced rates of water infiltration, increased wind and water erosion, and destruction of vegetation. Compaction of desert soil reduces the root growth of desert plants and makes it harder for seedlings to survive. Excessive motorized travel over time causes a decrease in plant life not only from trampling but also from proliferation of dust particles. Dust that is accumulated on plants can cause transpiration failure and eventual death of the plants (Lovich and Bainbridge 1999). Effects to soils, over time, cause erosion of soils, loss of topsoil, and compaction of soils. These impacts bring changes in the types of vegetation that can be sustained within desert landscapes and lead to adverse cumulative impacts to vegetation and insect resources.

OHV recreation, open camping and firewood collection has led to diminished organic soil matter, decreased vegetative vigor, soil compaction in roads and campsites, and increased wind and water erosion rates.

Cumulative impacts to vegetation and insect resources within the Planning Area would increase as a result of an increased demand for renewable energy, such as wind, geothermal, and solar developments. The cumulative effects of energy development, transmission, and storage within the Planning Area as well as the surrounding region are likely to increase throughout the life of the plan. As the growing population of the West demands more energy, the BLM would continue to accommodate these needs where practicable. Under all alternatives, public lands could be marked with increased energy

related infrastructure and maintenance roads, which would likely also increase the proliferation of OHV travel.

4.5.6.2 Reasonably Foreseeable Projects

Table 4.1 provides a list of current and reasonably foreseeable projects, including proposed renewable energy projects, various BLM-authorized actions, and other actions that may be considered. Most projects have either undergone independent environmental review pursuant to NEPA (and in some cases pursuant to the California Environmental Quality Act) or will do so prior to approval. The reasonably foreseeable projects that may affect vegetation resources are listed in Table 4.1.

4.5.6.3 Cumulative Impact Differences between Alternatives

Potential impacts to vegetation and insect resources from lands available for geothermal energy development would be lowest under Alternatives 3 and 4. Under these alternatives, either no acres would be available for geothermal development or NSO stipulations would apply. Impacts under Alternatives 1, 2, 5, 6, 7 and 8, would be similar among them with varying amounts of acres available for geothermal development, resulting in a greater potential for impacts to vegetation and insect resources. Geothermal leasing has the potential to contribute to cumulative impacts to vegetation and insect resources. However, there are currently no geothermal lease applications within the Planning Area and there are no reasonably foreseeable leases, therefore, no cumulative impacts to vegetation and insect resources from these actions can be anticipated.

Under Alternatives 2 and 3, the most acres closed to OHV recreation occur. Under these alternatives, impacts would be lowest. Alternatives 1, 4, 5, 6, 7, and 8, impacts from recreation would be similar among themselves overall, and greater than under Alternatives 2 and 3 (see Table 4-3). Recreational activities would be reasonably foreseeable to continue within all areas open to OHV recreation, resulting in minor to moderate cumulative impacts to vegetation and insect resources under all alternatives.

Impacts from solar and wind energy development to vegetation and insect resources would be lowest under Alternatives 3 and 8, which propose the fewest acres available for wind and solar development within the Planning Area. Impacts under Alternatives 1, 2, 4, 5, 6, and 7 would be similar among them, with varying amounts of acres available or with NSO stipulations for wind and solar development, resulting in a greater potential for impacts to vegetation and insect resources (see Table 4-3).

Impacts from law enforcement or emergency search and rescue activities, including USBP activities, would continue to result in soil compaction and erosion, which would

result in cumulative impacts to vegetation and insect resources. These impacts would be similar for all alternatives.

4.5.7 Mitigation Measures

Management actions to control the invasion and spread of invasive species under all alternatives in Chapter 2, Section 2.3.6, as well as monitoring of vegetation communities and insect populations, and restoration of damaged or disturbed areas would avoid, minimize, and mitigate impacts to vegetation resources in the Planning Area.

4.6 Impacts on Wildlife Resources

BLM manages habitat for wildlife and therefore activities that result in surface disturbance to vegetation could result in impacts to wildlife habitat as well as direct mortality of individual wildlife species.

4.6.1 General Wildlife

Habitat loss is defined as temporary or permanent conversion of habitat to an unusable form for wildlife species. The level of loss is dependent upon the size and scale of the surface-disturbing activity and could include, but is not limited to, geothermal leasing activities, recreational use, construction of new recreational facilities, road building, and ROWs. Temporary losses are impacts from construction or other surface-disturbing activities that would recover post-activity. Permanent losses include conversion of habitat from construction of permanent facilities and structures. Habitat loss would be minimal in the wilderness and ACECs, which are designated to protect sensitive resource values. Exclusion and avoidance areas would also help to protect sensitive resources (including wildlife habitat) by directing projects into less sensitive areas.

Habitat would be fragmented when a barrier preventing wildlife movement is sufficient to separate a species from portions of its habitat. Renewable energy (solar and wind) or geothermal development involving large areas of surface disturbance could result in fragmentation when the scale or level of the project is sufficient to prevent wildlife movement or to convert large areas into unsuitable habitat, leaving blocks of suitable habitat unconnected or fragmented.

Habitat quality is measured by the degree to which the habitat meets the minimum needs of an animal's environment, including food, water, and cover. Impacts to habitat quality could include either degradation or enhancement depending on the activities or decisions implemented. Degradation could be caused by activities that would decrease access by wildlife to food, water, and cover. Enhancement could be caused by activities (e.g., vegetative management) that result in an increase to quality and/or quantity of

food, water, and cover. Some of the vegetative management activities (e.g., non-native invasive plant species removal) would result in temporary degradation to habitat, but overall would result in enhancement of habitat quality due to restoration of natural ecosystem function and increased quality of forage. Human activity could spread non-native invasive plants resulting in degradation of native habitat. Wildlife habitat improvement projects (e.g., wildlife guzzlers) would increase the amount of available water.

Geothermal development can include multiple production and injection wells installed on pads that vary from 1 to 5 acres in size. Although they require less land for the plant itself, water-cooled geothermal systems need a continuous supply of water and create vapor plumes. Pipelines are constructed above ground, on supports, to transport geothermal fluids. Geothermal facilities can also include fencing, off-site access roads and transmission lines, ancillary buildings, water storage and discharge facilities, as well as drilling rigs or derricks and associated support facilities (Office of Indian Energy and Economic Development 2009a). Impacts to wildlife associated with geothermal development could include habitat degradation, fragmentation, or loss, as well as potential mortality of individual animals.

Recreational activities could result in degradation of wildlife habitat and mortality to individual animals through vehicle impacts and trampling. Construction activities could result in mortality through crushing and destruction of individual animals, nests, or burrows. Utility structures (e.g., power lines, wind turbines, communication towers) could result in bird and bat strike or electrocution. Undesirable species could be attracted into the Planning Area by human activities (e.g., ravens attracted to trash receptacles).

Utility-scale solar energy development can include commitment of a large land area for both PV and CSP systems. This land area would be used for the solar systems themselves (whether PV or CSP) as well as ancillary buildings, water storage and discharge facilities, fencing, access roads, and off-site facilities such as a central power management facility with transmission and grid connections. The land disturbance would be greater for PV (9 acres per MW versus 5 acres per MW for CSP) due to the interconnectedness of the blocks of solar arrays and the lower efficiency rates. However, water use would be considerably greater for CSP, as PV uses minimal water (Office of Indian Energy and Economic Development 2009b). As with solar energy development, wind energy development can include commitment of a large land area. This land area would be used for the wind turbines themselves (which can range from 200 to 300 feet in height) as well as ancillary facilities, fencing, access roads, and a central power management facility with transmission and grid connections (Office of Indian Energy and Economic Development 2009c). Impacts to wildlife associated with solar and wind energy development could include habitat degradation, fragmentation, or loss, as well as potential mortality of individual animals.

4.6.2 Priority Wildlife Species

The priority wildlife identified by the BLM for management includes raptors, non-game migratory birds, bats, and game animals.

Foraging habitat could be impacted by vegetation management activities, which could temporarily reduce the prey base within the foraging areas. Manual and mechanical vegetation management would result in an increase in foraging area by reducing the vegetative understory while minimizing adverse effects to the prey base. Non-native invasive species removal could result in benefits to foraging habitat by promoting the success of native vegetation communities. Other ground-disturbing activities (such as discretionary construction) could alter or eliminate habitat areas for prey species thereby degrading raptor foraging habitat.

Vegetative management activities that result in narrow, linear surface disturbance could benefit some wildlife by exposing new and additional foraging habitat for edge-dwelling species. In particular, linear surface disturbance could benefit some non-game migratory bird species by opening the shrub canopy and encouraging annual growth which would support more seed-eating birds as well as birds feeding on insects supported by the new annual growth. Vegetative management activities could reduce the amount of roosting habitat available for tree-roosting bat species and the amount of cover available to some game species.

Non-native invasive plant species' removal could result in benefits to foraging habitat by promoting the success of native vegetative communities. Wildlife habitat improvement projects (e.g., wildlife guzzlers) would increase the amount of available water for priority species. In areas where water resources are a limiting factor, construction of these waters would concentrate game animals resulting in increased competition for vegetative resources in adjacent areas and a higher rate of disease transmission. In areas where water resources are not a limiting factor, construction of wildlife waters would promote population dispersal into underutilized areas. However, wildlife guzzlers could also increase the presence of predator species, such as coyotes and bobcats.

Within the Planning Area, migratory and breeding bird abundance was found to be higher in areas closed to OHV recreation. Out of the 18 most common bird species found, seven were significantly more abundant in areas closed to OHV recreation. Significantly more migratory and breeding birds were found in areas closed to OHV recreation (e.g., North Algodones Dunes Wilderness), and circumstantial evidence in the data suggested that the best habitat within the Planning Area was also found in areas closed to OHV recreation (Appendix R).

Wind energy and other utility development could result in an increased mortality of individuals (e.g., bird and bat strikes, powerline electrocution). Other ground-disturbing

activities (such as discretionary construction) could alter or eliminate foraging habitat. Motorized vehicle travel could result in bird strikes or destruction of ground nests.

4.6.3 Differences between Alternatives

Under Alternatives 1 and 2, the CDCA Plan would not be amended. Wildlife resource management actions under Alternatives 3 through 8 would not require a CDCA Plan Amendment; management actions would remain in compliance with the CDCA Plan.

Some BLM land use plan decisions and authorized activities would be beneficial through habitat protection and enhancement, while others would be adverse by authorizing discretionary activities, such as development activities, that could result in detrimental effects to habitat.

Impacts to wildlife resources, including priority species, from geothermal development would vary by alternative. Geothermal development would adversely impact the least amount of acres under Alternatives 3 and 4. Under Alternatives 5 and 6, 11,939 acres would be available for geothermal leasing and under Alternative 8, 35,115 acres would be available for geothermal leasing. Under these alternatives, moderate adverse impacts to wildlife resources would occur as compared to Alternatives 3 and 4. Under Alternatives 1, 2, and 7, lands available for geothermal development would increase and, in turn, potential adverse impacts to wildlife resources would be greater. Under these alternatives, there would be increased potential for the loss of habitat, disturbance of species communities, and direct mortality due to geothermal construction and development activities within the Planning Area (see Table 4-3).

OHV area designations would adversely impact wildlife resources, including priority species, the least under Alternatives 2 and 3 (see Table 4-3). The greatest number of acres closed or limited to OHV recreation is found under these alternatives. Motorized travel would not be authorized within proposed closed OHV management areas, and loss of habitat, disturbance of species communities, and direct mortality from OHV recreation would no longer occur. Under Alternatives 4, 5, and 6, adverse impacts to wildlife resources would be greater than under Alternatives 2 and 3 but less than under Alternatives 1, 7, and 8. Under Alternatives 1, 7, and 8 there would be increased acreages open to OHV recreation resulting in an increased number of acres of habitat potentially lost or disturbed within the Planning Area (see Table 4-3).

Adverse impacts to wildlife resources, including priority species, from solar and wind development would be the lowest under Alternatives 3 and 8. Under Alternatives 4, 5, and 6, adverse impacts to wildlife resources would be greater than under Alternatives 3 and 8 but less than under Alternatives 1, 2, and 7. Under Alternatives 4, 5, and 6 there would be 144,290 acres of land designated as avoidance areas. Under Alternatives 1, 2, and 7, lands available for solar and wind development would increase and, in turn, potential

adverse impacts to wildlife resources would be greater. Under these alternatives, there would be increased acreages of construction and development for solar and wind sites within the Planning Area (see Table 4-3).

Under Alternatives 3, 4, and 8, potential beneficial impacts to wildlife would occur from the reduction or exclusion of the following: lands not available to geothermal leasing; available for geothermal leasing but with an N SO stipulation; areas closed to OHV recreation; and avoidance or exclusion areas for solar or wind energy ROW leases. The exclusion of surface-disturbing activities would result in the reduction of disturbance and direct mortality of wildlife from construction (geothermal, solar, and wind energy projects) and recreational use (areas closed to OHV recreation). Under Alternative 3, the least number of acres would be available for mineral resource (geothermal) leases (188,426 acres not available for surface occupancy), and the greatest number of acres would be closed to OHV recreation (87,778 acres) and excluded from solar or wind energy project ROW leases (141,702 acres). Under Alternative 4, 188,426 acres would be available to geothermal lease but with an N SO stipulation (no surface disturbance could occur), 144,290 acres would be designated as avoidance areas for solar or wind energy project ROW leases, and 4,847 acres as excluded for solar or wind energy projects. Under Alternative 8, 136,691 acres would not be available and 14,025 acres would be available but with an N SO stipulation for geothermal lease, and 161,226 and 153,717 acres, respectively, would be excluded from solar or wind energy project ROW leasing.

Under all Alternatives, the North Algodones Dunes Wilderness (26,098 acres) is closed to all motorized use, which would continue to help prevent disturbance and direct mortality of wildlife. Under all alternatives, no wood collection would be allowed within ACECs (6,097 acres), and restoration treatments would be performed in areas where damage has occurred or where vehicle incursions have occurred. These management actions would result in improved wildlife habitat. Under all alternatives, the East Mesa ACEC would be designated as Limited to OHV recreation (limited to designated routes of travel only). This designation would result in the protection of wildlife resources outside of designated routes within the ACEC's.

Differences between alternatives related to the management of the microphyll woodlands as described for vegetation resources (Section 4.5.1) would also apply to wildlife resources, resulting in beneficial effects that vary by alternative.

4.6.4 Irreversible and Irretrievable Commitment of Resources

Implementation of the Proposed RAMP/CDCA Plan Amendment would result in surface-disturbing activities (e.g., mineral, energy, ROWs, and recreational activities) that would cause irreversible or irretrievable commitment of wildlife resources. Surface-disturbing

activities may irreversibly alter soils, while also resulting in the loss of vegetation and wildlife habitat.

4.6.5 Unavoidable Adverse Impacts

Potential renewable energy development within the Planning Area (see Table 4-2) would result in long-term unavoidable impacts to wildlife, primarily in the form of habitat disturbance and loss from development projects. Mitigation measures to minimize these impacts would be required; however, permanent loss of wildlife habitat would occur. Project level analysis would be required on a case-by-case basis for these proposed projects.

BLM law enforcement or emergency search and rescue activities occurring in areas supporting priority species would result in unavoidable adverse impacts to wildlife resources. These impacts could be caused by flushing wildlife from cover and disrupting natural processes, such as breeding behavior or foraging, and result in direct or indirect mortality.

4.6.6 Short-term Use and/or Long-term Productivity

Habitat converted to permanent facilities or structures would result in a net loss of wildlife habitat as long as those facilities or structures remain in use. Mitigation measures to minimize these impacts would be required; however, permanent impacts to wildlife habitat would likely occur.

4.6.7 Cumulative Impacts

4.6.7.1 Geographic Extent

The geographic extent (assessment area) for cumulative impacts to wildlife is the Planning Area. The existing condition for wildlife resources in the Planning Area, which represents the aggregate effect of past and present actions impacting wildlife resources, is described in Chapter 3, Section 3.6. In general, actions within the Planning Area are not expected to affect adjacent lands; however, management actions that avoid or minimize impacts to vegetation and wildlife resources may also result in the protection of wildlife habitat and populations on adjacent lands.

Impacts affecting soils, water, and vegetation resources would affect wildlife within the Planning Area. Continued recreational use and development of BLM-administered land as well as private lands surrounding the Planning Area have resulted in cumulative adverse impacts to wildlife populations and habitats. These activities are likely to persist in the Planning Area and surrounding areas into the foreseeable future.

The paving and expansion of road networks and development in and adjacent to the Planning Area would result in cumulative adverse impacts to wildlife due to increased volume of vehicle travel at higher speeds. Much of the habitat described as microphyll woodlands within the Planning Area is sustained by sheet flow from the neighboring desert pavement and mountain complexes. As these areas are interrupted by roadway or other ROW development, flow patterns would be disturbed. Rain events are more likely to pool up and evaporate in roadway depressions and tracks or collect beside the ROW. Flows may be permanently interrupted and no longer capable of feeding certain wash woodlands, which provide important wildlife habitat within the Planning Area.

The presence of humans, recreational activities, and noise reduce the value of vegetation to wildlife. Increased dispersed camping and/or day use would cause loss of such vegetation, which would affect deer, reptiles, and migratory birds.

4.6.7.2 Reasonably Foreseeable Projects

Table 4.1 provides a list of current and reasonably foreseeable projects, including proposed renewable energy projects, various BLM-authorized actions, and other actions that may be considered. Most projects have either undergone independent environmental review pursuant to NEPA (and in some cases pursuant to the California Environmental Quality Act) or will do so prior to approval. The reasonably foreseeable projects that may affect wildlife resources are listed in Table 4.1.

4.6.7.3 Cumulative Impact Differences between Alternatives

Wildlife resources, including priority wildlife species, on public lands may be affected by present and future off-site use and development under all alternatives, including the Proposed Plan and CDCA Plan Amendment.

Potential impacts to wildlife resources from lands available for geothermal energy development would be least under Alternatives 3 and 4. Under these alternatives, either no acres would be available for geothermal development or NSO stipulations would apply. Impacts under Alternatives 1, 2, 5, 6, 7 and 8 would be similar among themselves with varying amounts of acres available for geothermal development and resulting in a greater potential for impacts to vegetation and insect resources. Geothermal leasing has the potential to contribute to cumulative impacts to wildlife resources. However, there are currently no geothermal lease applications within the Planning Area or any reasonably foreseeable leases, therefore, no cumulative impacts to wildlife resources from these actions can be anticipated.

The past and present development and public use of recreational sites in the Planning Area have resulted in the loss of wildlife habitat productivity. Under Alternatives 2 and 3, the most acres closed to OHV recreation would occur. Under these alternatives, impacts

would be lowest. Under Alternatives 1, 4, 5, 6, 7, and 8, impacts from recreation would be similar among themselves overall and greater than under Alternatives 2 and 3 (see Table 4-3). Recreational activities would be reasonably foreseeable to continue within all areas open to OHV recreation, resulting in minor to moderate cumulative impacts to wildlife resources under all alternatives.

Impacts from solar and wind energy development to wildlife resources would be lowest under Alternatives 3 and 8, which propose the fewest acres available for wind and solar development within the Planning Area. Impacts under Alternatives 1, 2, 4, 5, 6, and 7 would be similar among themselves, with varying amounts of acres available or with NSO stipulations for wind and solar development, resulting in a greater potential for impacts to wildlife resources (see Table 4-3).

Law enforcement or emergency search and rescue activities, including USBP activities, would continue to result in habitat disturbance and direct mortality which would result in cumulative impacts to wildlife resources. These cumulative impacts would be similar under all alternatives.

4.6.8 Mitigation Measures

Management actions to reduce impacts to wildlife species are included under all alternatives in Chapter 2 (Section 2.3.7). These measures include monitoring of wildlife habitat and populations and restoration of damaged or disturbed areas. These measures would avoid, minimize, and mitigate impacts to wildlife resources in the Planning Area.

4.7 Impacts on Special Status Species

The general habitat impacts for all special status species are described above in the Vegetative (Section 4.5) and Wildlife (Section 4.6) resources sections. The information below refers specifically to the special status species found within BLM-administered lands in the Planning Area. The USFWS has identified two federally listed species as occurring within the Planning Area: PMV and Mojave Desert tortoise (USFWS 2009). There are four State of California-listed threatened or endangered, or rare species: Wiggin's croton, Algodones Dunes sunflower, Gila woodpecker, and Arizona Bell's vireo. There are 14 BLM Sensitive species: Munz's cholla, giant Spanish needle, sand food, Orocopia sage, spotted bat, California leaf-nosed bat, cave myotis, Townsend's big-eared bat, burrowing owl, LeConte's thrasher, lowland leopard frog, Couch's spadefoot toad, flat-tailed horned lizard, and Colorado Desert fringe-toed lizard.

The analysis in this section focuses on impacts to special status species as a result of management actions that affect species or their populations and changes to the condition of their habitats.

The following assumptions were used in the analysis:

- Local populations are naturally affected by non-human-caused factors such as climate, natural predation, disease outbreaks, natural fire regimes, and competition for available habitat from other native species.
- Ground-disturbing activities could lead to modification (beneficial or adverse), loss (short-term or long-term), or fragmentation of special status species habitat and/or loss or gain of individuals, depending on the amount of area disturbed, species affected, and location of the disturbance.
- Changes in air, water, and habitat quality could lead to direct impacts and could have cumulative impacts on species survival.
- Impacts on special status species could be more significant than impacts on non-special status species.
- The USFWS would be consulted on any action that could potentially affect any listed plant or animal species or their habitat.

In accordance with Section 7(a)(2) of the ESA of 1973, as amended, the BLM would initiate Section 7 consultation with the USFWS. This process involves preparing a biological assessment (BA) that includes impact analyses and subsequent determinations for all federally listed and proposed species. The BA considers potential project-related effects (direct and indirect) on each species and its habitat from the management actions presented in the Proposed RAMP/CDCA Plan Amendment and Final EIS. Additional consultation with the USFWS would still be required for all implementation-level activities if they would be implemented within suitable or potentially suitable habitat for federally listed species.

Various laws, regulations, and policies require that special status species be fully analyzed in any BLM decision that could affect those species or their habitat. Analysis would include inventory, monitoring, evaluation, and identification of mitigation of effects. Mitigation actions would include project relocation or redesign (avoidance), monitoring, and site-specific mitigation.

The number of species that could be affected by various actions is directly correlated with the degree, nature, and quantity of surface-disturbing activities in the Planning Area. Impacts are quantified where possible. In the absence of quantitative data, best professional judgment was used. To preserve specific species, further analyses would be required at the implementation level following site-specific species inventories.

Three general categories of impacts would be anticipated to be the most influential on special status species and their habitat—habitat alteration, fragmentation, and/or loss; displacement; and habitat enhancement. Habitat alteration occurs when decisions

change the existing habitat character. Surface-disturbing activities, development, or other activities that degrade habitat could lead to habitat alteration, fragmentation, or loss. Habitat alteration, fragmentation, and loss may affect the usable ranges and routes for special status species wildlife movement. In addition, loss of habitat for pollinators of special status plants could result in the decline or loss of special status plant populations.

Special status species wildlife displacement occurs when land use activities result in the movement of wildlife into other habitats, increasing stress on individuals, and increasing competition for habitat resources. Impacts on special status species from displacement depend on the location, extent, timing, and/or the intensity of the disruptive activity or human presence. Occurrences of these disruptive activities in areas adjacent to special status species habitat cause displacement. Impacts from displacement could be greater for special status species with limited existing habitat and/or a low tolerance for disturbance. Habitat maintenance and enhancement could maintain or improve the condition of vegetation and levels of forage species and maintain existing erosion rates or reduce soil loss through vegetation treatments and restrictions on surface-disturbing activities.

Impacts on special status species are not anticipated as a result of implementing management actions for the following resources and designations: air quality, water resource management, cultural resource management, and paleontological resource management.

4.7.1 Habitat Alteration, Fragmentation, and/or Loss

Authorized vegetative treatments would be conducted in localized areas where invasive species (specifically tamarisk) occur. The short- and long-term impacts associated with these actions would not be detrimental to the species and their associated habitat given the limited footprint of such actions on the landscape. Over the long term, the treated areas would provide improved vegetation communities, which would enhance habitat for some special status species.

Permitted surface-disturbing activities cause habitat alteration, fragmentation, and/or loss depending on the type, amount, and location of activity. Habitat fragmentation occurs when contiguous habitat is broken up (fragmented) by surface-disturbing activities, causing a reduction in usable ranges; disruption of movements among habitats, transitional areas, and breeding areas; isolation of smaller, less mobile species; and increase in habitat generalists that are characteristic of disturbed environments (Harris 1991).

Locatable (e.g., gold, silver) and salable (e.g., sand, gravel) mining activities would result in habitat alteration, damage or injury to individuals (plants and wildlife), damage to plant

seed banks, and loss of pollinators. Leasable mineral activities (geothermal) would result in alteration of habitat at well pad locations, access roads, transmission and generation infrastructure, and potential releases of geothermal fluids. Pipelines could alter sand flow and movement.

Mineral resource activities and construction of associated facilities could result in the loss of special status species habitat. Special status species habitat losses include potential habitat for special status species plants; cover for small reptiles and amphibians; winter concentration, nesting, and foraging habitat for birds; and roost and foraging areas for bats. In addition, the loss of habitat for pollinators of special status plants could result in the decline or loss of plant populations. Seclusion areas for special status wildlife species would become smaller, more fragmented, and dispersed in these areas, which could lead to a decrease in populations as a result of habitat loss.

Geothermal development can include multiple production and injection wells installed on pads that vary from 1 to 5 acres in size. Although they require less land for the plant itself, water-cooled geothermal systems need a continuous supply of water and create vapor plumes. Pipelines are constructed above ground, on supports, to transport geothermal fluids. Geothermal facilities can also include fencing, off-site access roads and transmission lines, ancillary buildings, water storage and discharge facilities, as well as drilling rigs or derricks and associated support facilities (Office of Indian Energy and Economic Development 2009 a). Impacts to special status species associated with geothermal development could include habitat degradation, fragmentation, or loss; potential mortality of individual animals, and damage to or death of individual plants.

Impacts would be minimal for locatable mineral development because a plan of operation, including a reclamation plan, is required prior to development of locatable minerals. The development of locatable minerals and mineral materials could cause localized impacts on special status species through the disturbance of habitat.

Recreation activity likely would have an effect on special status species and their habitats. Motorized recreation would have greater effects than non-motorized recreation. Recreationists could introduce noise that could disturb species during sensitive periods, which could indirectly affect reproduction or cause species to abandon areas, such as nest sites or areas containing key habitat components containing important food sources. Stress inflicted on species could also deteriorate species health, which could affect survivability. Displaced wildlife incurs a physiological cost through excitement (preparation for exertion) and/or through locomotion. A fleeing or displaced animal incurs additional costs through loss of food intake and potential displacement to lower quality habitat. Chronic or continuous disturbance could result in reduced animal fitness and reproductive potential, and abandonment of young (mortality; Geist 1978). Effects likely would be greater in areas that receive frequent and/or intense recreation use; however, the number of areas of frequent and/or intense recreation use is small. Although damage to special status species habitats would continue to be monitored, impacts from

dispersed use would not be apparent until after the damage has occurred, which would then be appropriately mitigated to the extent practical and feasible.

Construction and/or maintenance of recreational facilities, including but not limited to roadways and buildings, could result in impacts to special status species through alteration of habitat or damage to individual plants or wildlife.

Utility-scale solar energy development can include commitment of a large land area for both PV and CSP systems. This land area would be used for the solar systems themselves (whether PV or CSP), ancillary buildings, water storage and discharge facilities, fencing, access roads, and offsite facilities such as a central power management facility with transmission and grid connections. The land disturbance would be greater for PV (9 acres per MW versus 5 acres per MW for CSP) due to the interconnectedness of the blocks of solar arrays and the lower efficiency rates. However, water use would be considerably greater for CSP, as PV uses minimal water (Office of Indian Energy and Economic Development 2009b). As with solar energy development, wind energy development can include commitment of a large land area. This land area would be used for the wind turbines themselves (which can range from 200 to 300 feet in height), ancillary facilities, fencing, access roads, and a central power management facility with transmission and grid connections (Office of Indian Energy and Economic Development 2009c). Impacts to special status species associated with solar and wind energy development could include habitat degradation, fragmentation, or loss; potential mortality of individual animals, and damage to or death of individual plants.

Authorized lands and realty activities would result in alteration of habitat at development locations, access roads, transmission, and generation infrastructure. Ground-level linear features (e.g., canals, pipelines, fences, roadways) could alter sand flow and movement and potentially fragment special status species habitats. Impacts from apiaries could result in competition with native pollinators. Any lands acquired by BLM would have the same or similar impact as adjacent BLM-administered lands.

ROW development (including power lines, pipelines, and communication sites) would disturb habitats that could be occupied by special status species where ROW developments are authorized. Most ROWs would be located in common (within existing or shared ROWs), which would result in concentrated surface disturbances and habitat deterioration or loss. Special status plants would be most affected by ROW development due to their inability to seek alternative habitats, whereas the majority of special status wildlife could seek alternative habitats if available. ROWs located in common could also reduce the degree of habitat fragmentation within the Planning Area if properly located outside of or on the fringe of special status species habitat. Locating ROWs in common could increase habitat loss or fragmentation if improperly located through known habitat.

Authorized vehicles, including but not limited to emergency response and law enforcement, on patrol and responding to incidents could result in disturbance or

injury/damage to special status plant and wildlife species. Authorized helicopter landings in known special status plant habitat could result in sand dispersal and damage to individual plants. UXO explorations and detonations could result in damage to special status species individuals and habitat as ordnance is found, exhumed, or destroyed. Hazardous material removal within special status species habitat could result in impacts to individuals, habitat, and plant pollinators.

4.7.2 Federally Listed Species

4.7.2.1 Peirson's Milk-vetch

The PMV was federally listed as a threatened species due to destruction of plants and modification of habitat associated with OHV recreation and associated recreational development (USFWS 1998). OHV recreation can impact PMV habitat by:

1. Disrupting the natural processes that support dune formation, movement, and structure, could disrupt the available habitat needed for individual and population growth
2. Causing the collapse of dune faces and ridges, which could result in burial of the seed bank
3. Disturbing surface sand, thereby decreasing soil moisture needed for establishment of individual plants and population growth
4. Degrading the psammophytic scrub vegetation community that provides habitat for pollinators required for reproduction

Impacts discussed in Impacts on Vegetative Resources (Section 4.5) would likely also apply to PMV communities. Adverse modification of PMV critical habitat could result from construction activities (e.g., geothermal, wind, solar, recreation facilities) that destroy or adversely modify important habitat features.

OHV recreation or walking may disturb the sand surface and may result in increased evaporative water loss in the dunes (Porter et al. 2005) and reduced water availability to PMV. The impacts to PMV habitat from recreational activities would also include crushing of plants via OHV and other vehicle traffic. Occasional non-motorized (e.g., hiking, equestrian) use could also result in damage to individual plants. Churning of the sand has been known to alter soil structure, which could impact PMV habitat. Disruption of the soil by OHV recreation could lead to additional damage to germinating seedlings.

4.7.2.2 Mojave Population of the Desert Tortoise

Primary threats to the Mojave population of the desert tortoise are related to loss and degradation of the species' habitat, through drought, wildfire, habitat destruction and fragmentation, and invasion of exotic plant and wildlife species. Other impacts to the species include removal of individuals from the wild, vandalism, mortality from vehicles, irresponsible OHV recreation, release of captive tortoises into the wild, and disease.

Construction activities may impact desert tortoise in a variety of ways, including: loss of habitat by the project footprint; incidental destruction of habitat in a buffer area around the footprint; damage to soil on the periphery of the project area; incidental death of unseen tortoises along roads, beneath crushed vegetation, or in undetected burrows; destruction of burrows; handling of tortoises; entrapment of tortoises in pits or trenches dug for transmission or fiber optic lines, water, and gas pipelines and other utilities; attraction of ravens and facilitation of their survival by augmenting food and water; and fugitive dust. Construction of a natural gas pipeline would have the greatest adverse impacts on tortoise and habitat, construction of a transmission line would have intermediate adverse impacts, and construction of fiber optic lines would have the most benign impacts. The differences are largely related to the scale of the projects, ability of crews to avoid disturbing burrows, and timing of construction to avoid peak activity periods for tortoises (spring and summer; Boarman 2002).

Energy developments, such as geothermal, solar, and wind energy generation, could result in habitat destruction and direct mortality from: off-road travel to explore and access sites; habitat loss to road and development construction; fugitive dust and soil erosion; and developments to support operations. Most of these energy sites would be point sources of disturbance with potentially little effect beyond the immediate site of development. Energy development sites result in direct and indirect loss of habitat, fragmentation of habitat and population, and increase access roads which can lead to direct mortality from vehicle use (Boarman 2002).

Anthropogenic noise and vibrations may adversely impact tortoises in several ways, including: disruption of communication and damage to the auditory system. Hierarchical social interactions, hearing, and vocal communication have all been identified in desert tortoise. It is likely that repeated or continuous exposure to damaging noises cause a greater reduction in auditory response (Boarman 2002).

OHV recreation may adversely affect tortoise populations in multiple ways: direct mortality by crushing tortoises on the surface or in burrows; indirect mortality through habitat alteration from soil compaction; vegetation destruction (direct or indirect); and, toxins from exhaust. In heavy OHV recreation areas, evidence has shown that desert tortoise population densities decline (Boarman 2002).

OHV recreation in desert tortoise habitat would result in disturbance to the soil, which could break down microbiotic crusts that support the vegetation, thereby degrading tortoise habitat. OHV recreation could prevent recruitment of perennial plant species, and cause injury to annual plant species that are important food sources for the tortoise.

Ravens are reported to be a significant predator of the desert tortoise. Ravens have been observed preying on juvenile tortoises as well as adults (Boarman 2002). Areas with trash receptacles may attract a larger number of ravens, which in turn may increase the likelihood of predation on desert tortoise.

Access routes through microphyll woodland habitat and open desert wash areas would result in direct impacts to the desert tortoise through running over tortoises or crushing of burrows.

4.7.3 State-listed and BLM Sensitive Species

Vegetation enhancement activities would improve the quality of native habitat and its ability to support these species. Surface-disturbing activities (wind, solar, and geothermal leases) could result in an impact to special status species through habitat conversion. Impacts described in Section 4.5, Impacts on Vegetative Resources and Section 4.6, Impacts on Wildlife Resources, would also apply to state-listed and BLM sensitive species.

It has been shown that prolonged noise could adversely affect some lizards and small mammals. Investigations by Brattstrom and Bondello (1983) on the effect of OHV noise included the desert kangaroo rat (*Dipodomys deserti*), desert iguana (*Dipsosaurus dorsalis*), and Mohave fringe-toed lizard (*Uma scoparia*). Desert kangaroo rats and fringe-toed lizards demonstrated an immediate loss of hearing when exposed to OHV sounds of 95 dB A. Recovery of the kangaroo rat hearing took several weeks, during which time they would have been more vulnerable to predation. Effects would be more likely where prolonged noise occurs. A single OHV can generate a noise level of 92 dBA at 50 feet, although the duration of the exposure is likely to be quite short as a vehicle passes by. Wildlife exposure to OHV noise is localized and only at high levels during the six major holiday weekends during the recreation season.

OHV recreation tends to be concentrated within the psammophytic scrub. As a consequence, some special status species such as the Colorado Desert fringe-toed lizard and endemic dune beetles occurring in these dunes would be killed or injured by OHV recreation. OHV recreation could affect Couch's spadefoot toad habitat through disturbance of small ephemeral pools for which this species depends. The tendency for Couch's spadefoot toad to aggregate during breeding season would place it at a higher risk from an increase in OHV recreation in this area.

Human activities could result in disturbance to special status plant species through direct impact to the plants or degradation of native habitat. Human activities include, but are not limited to, OHV recreation, camping (including recreational vehicles), hiking, and other recreational activities. Concentrated recreational use in open OHV areas would likely result in the loss or displacement of special status wildlife species.

4.7.4 Differences between Alternatives

4.7.4.1 Federally Listed Species

4.7.4.1.1 Peirson's Milk-vetch

Under Alternatives 1 and 2, the CDCA Plan would not be amended. Table 4-8 presents the CDCA Plan Amendments for PMV by alternative.

TABLE 4-8
CDCA PLAN AMENDMENTS FOR PEIRSON'S MILK-VETCH BY ALTERNATIVE

CDCA Plan Amendment	1	2	3	4	5	6	7	8
Prohibit motorized recreation within PMV critical habitat (see Maps 2-21, 2-23, and 2-26).	n/a	n/a	X		X			X
Allow motorized recreation in some areas of PMV critical habitat (existing and future designated) and prohibit motorized recreation in other areas of critical habitat (see Maps 2-24 and 2-25).	n/a	n/a				X	X	
Open some areas of critical habitat (existing and future designated) with some limited motorized recreation (seasonal closures, nighttime closures) (see Map 2-22).	n/a	n/a		X				
Exclude PMV critical habitat from solar energy development.	n/a	n/a	X					X
Exclude PMV critical habitat from wind energy development.	n/a	n/a	X					X
Exclude PMV critical habitat from all other types of land use authorization.	n/a	n/a	X					X
Classify PMV critical habitat as an avoidance area for solar energy development.	n/a	n/a		X	X	X		
Classify PMV critical habitat as an avoidance area for wind development.	n/a	n/a		X	X	X		
Classify PMV critical habitat as an avoidance area for all other types of land use authorization.	n/a	n/a		X	X	X		
Open PMV critical habitat to solar development.	n/a	n/a					X	
Open PMV critical habitat to wind development.	n/a	n/a					X	
Open PMV critical habitat to all other types of land use authorization.	n/a	n/a					X	

Impacts to PMV from geothermal leasing would vary by alternative. Geothermal leasing would have the greatest adverse impacts to PMV under Alternatives 1, 2, and 7. Under these alternatives, 188,426 acres (88 percent) of the Planning Area, except the North Algodones Dunes Wilderness, would be available for geothermal leasing and surface occupancy (see Table 4-3 and Map 2-7). Under these alternatives, PMV critical habitat would not be excluded from geothermal energy development surface occupancy. Under Alternatives 5 and 6, 11,939 acres (5 percent) of the Planning Area would be available for geothermal leasing and surface occupancy (see Table 4-3 and Map 2-10). These alternatives include a small portion of PMV critical habitat south of SR-78.

Under Alternative 4, 188,426 acres would be available for geothermal leasing under an NSO stipulation (see Table 4-3 and Map 2-9). PMV critical habitat would likely not be adversely impacted under this alternative. The NSO stipulation under this alternative would result in beneficial effects in that no surface disturbance to PMV critical habitat as well as non-designated habitat would likely occur. Under Alternative 3, no geothermal leasing would be allowed within the Planning Area (see Table 4-3 and Map 2-8). Under this alternative, PMV critical habitat would not be adversely impacted by geothermal development and the elimination of surface-disturbing activities related to geothermal development would result in beneficial effects to PMV critical habitat. Under Alternative 8, 35,115 acres would be available for geothermal leasing, however, PMV critical habitat is not included in available lands and would not likely be adversely impacted under this alternative.

Under Alternative 1, 2,845 acres of PMV critical habitat would be closed to OHV recreation, while the remainder of the Planning Area would be limited (1,385 acres) or open (7,661 acres) to OHV recreation (see Table 4-3, Table 4-9 and Map 2-19). OHV recreation within the open OHV recreation areas of critical habitat would likely result in the loss of habitat, disturbance of species, and direct mortality from OHV recreation. Under Alternative 2, 2,275 acres of PMV critical habitat would be open to OHV recreation, with 9,617 acres closed (Table 4-9 and Map 2-20). Areas closed to OHV recreation would result in beneficial effects to PMV through the elimination or reduction in the loss of habitat, disturbance of species, and direct mortality from OHV recreation.

**TABLE 4-9
POTENTIAL OHV IMPACTS TO PEIRSON'S MILK-VETCH
CRITICAL HABITAT BY ALTERNATIVE (ACRES)**

	Alternative							
	1	2	3	4	5	6	7	8
PMV Critical Habitat								
Open OHV	7,661	2,275	9	1,527	9	5,271	3,394	0
Closed OHV	2,845	9,617	11,882	9,353	11,882	6,620	8,497	11,891
Limited OHV	1,385	0	0	1,012	0	0	0	0

Under Alternatives 3 and 5, only 9 acres of PMV critical habitat would be open to OHV recreation (see Table 4-9). Motorized travel would not be authorized within 11,882 acres of proposed closed OHV management areas, and loss of habitat, disturbance of species, and direct mortality from OHV recreation would not occur (see Table 4-9, Maps 2-21 and 2-23), resulting in beneficial effects to PMV.

Under Alternative 4, adverse impacts to PMV critical habitat would be greater than under Alternatives 3 and 5 but less than under Alternatives 1, 2, 6, and 7 (see Table 4-9 and Map 2-22). Under this alternative, 9,353 acres of PMV critical habitat would be closed to OHV recreation and 1,527 acres would be open to OHV recreation. A small portion, 1,012 acres, of PMV critical habitat would be designated as a seasonal restriction area (limited OHV) based on a rainfall threshold (Map 2-22). Under Alternatives 6 and 7, a portion of PMV critical habitat would be closed to OHV recreation (see Table 4-9, Maps 2-24 and 2-25). Under Alternatives 6 and 7, there would be 5,271 and 3,394 acres, respectively, open to OHV recreation within the Planning Area. Critical habitat units known to have the highest densities of PMV would be closed to OHV recreation under these alternatives (6,620 acres under Alternative 6 and 8,497 acres under Alternative 7), resulting in beneficial effects to PMV within these densely populated areas. All PMV critical habitat would be closed to OHV recreation under Alternative 8. Motorized travel would not be authorized within PMV critical habitat of proposed closed OHV management areas; loss of habitat, disturbance of species, and direct mortality from OHV recreation would not occur, resulting in a beneficial effect on PMV.

Under Alternatives 1, 2, and 7, lands available for solar and wind leasing would be the highest, resulting in greater potential adverse impacts to PMV critical habitat. Under these alternatives, 188,833 acres would be available for solar and wind development, including most portions of PMV critical habitat, except that found in the North Algodones Dunes Wilderness (see Table 4-3 and Maps 2-29 and 2-33), resulting in potential loss of habitat, disturbance of species, and direct mortality of PMV.

Under Alternatives 3 and 8, all portions of PMV critical habitat would be excluded from solar and wind development (see Table 4-3 and Maps 2-30, 2-32, 2-34, and 2-36), and no adverse impacts to PMV critical habitat are likely to occur. Under these alternatives, development would not be authorized within PMV critical habitat and loss of habitat, disturbance of species, and direct mortality from development-related surface-disturbing activities would not occur, resulting in a beneficial effect on PMV.

Under Alternatives 4, 5, and 6, there would be 144,290 acres of land designated as avoidance areas, including portions of PMV critical habitat. An avoidance area is defined as an area to be avoided but may be available for location of right-of-ways with special stipulations. PMV critical habitat may be adversely impacted under these alternatives, if solar and wind energy proposals have no other reasonable location. Under these alternatives, critical habitat within the North Algodones Dunes Wilderness would

continue to be excluded. Avoidance areas would likely reduce the potential impacts to PMV from surface-disturbing activities, resulting in a beneficial effect on PMV.

4.7.4.1.2 Mojave Population of the Desert Tortoise

Under Alternatives 1 and 2, the CDCA Plan would not be amended. Table 4-10 presents the CDCA Plan Amendments for desert tortoise by alternative.

**TABLE 4-10
CDCA PLAN AMENDMENTS FOR SPECIAL STATUS SPECIES BY ALTERNATIVE**

CDCA Plan Amendment	1	2	3	4	5	6	7	8
Limit motorized recreation (within corridors or routes) within habitat for the Mojave population of the desert tortoise west of the UPRR tracks.	n/a	n/a		X				
Prohibit camping within desert tortoise habitat.	n/a	n/a	X					
Allow camping within designated areas of desert tortoise habitat.	n/a	n/a		X				X
Open desert tortoise habitat to all motorized recreation.	n/a	n/a					X	

Impacts to the Mojave population of the desert tortoise from geothermal development would vary by alternative. Geothermal development would have the greatest adverse impacts to desert tortoise under Alternatives 1, 2, 7, and 8. Under these alternatives, all of potential desert tortoise habitat along the eastern portion of the Planning Area (east of the UPRR tracks), would be available for geothermal development and surface occupancy (see Table 4-3, Maps 2-7 and 2-11).

Under Alternative 3, no geothermal development would be allowed within the Planning Area (see Table 4-3 and Map 2-8). Under this alternative, desert tortoise habitat would not be adversely impacted by geothermal development and the protection of habitat would result in a beneficial effect.

Under Alternative 4, 188,426 acres of the Planning Area would be available for geothermal development but with an NSO stipulation (see Table 4-3 and Map 2-9). Desert tortoise habitat within the Planning Area would likely not be adversely impacted under this alternative. The NSO stipulation under this alternative would result in beneficial effects in that no surface disturbance to potential desert tortoise habitat would likely occur. Under Alternatives 5 and 6, 11,939 acres (5 percent) of the Planning Area would be available for geothermal development and surface occupancy (see Table 4-3 and Map 2-10). Only a small portion of these acres are located within potential desert tortoise habitat (north of SR-78, east of the UPRR tracks). Under these alternatives, adverse impacts to desert tortoise may occur but would likely be minimal overall.

Under all alternatives, habitat for the Mojave population of the desert tortoise east of the UPRR tracks would continue to be limited to OHV recreation. Limited OHV recreation

would likely result in minimal loss of habitat, disturbance of species, and potential direct mortality from OHV and other recreation, as well as from other motorized vehicles, resulting in a beneficial effect on desert tortoise overall.

Under Alternatives 1, 2, and 7, lands available for solar and wind development would be the highest, resulting in greater potential adverse impacts to desert tortoise habitat. Under these alternatives, 188,833 acres would be available for solar and wind development, including all of potential desert tortoise habitat (see Table 4-3 and Maps 2-29 and 2-33), resulting in potential loss of habitat, disturbance of species, and possible direct mortality of tortoise. Under Alternatives 3, 4, 5, 6, and 8 the majority of tortoise habitat would also be available for solar and wind development (see Table 4-3 and Maps 2-30, 2-31, 2-32, 2-34, 2-35, and 2-36); adverse impacts to tortoise and potential habitat may occur under these alternatives as well.

4.7.4.1.3 State-listed and BLM Sensitive Species

Under Alternatives 1 and 2, the CDCA Plan would not be amended. Table 4-11 presents the CDCA Plan Amendments for state-listed and BLM sensitive species by alternative.

**TABLE 4-11
MANAGEMENT ACTIONS FOR SPECIAL STATUS SPECIES BY ALTERNATIVE**

CDCA Plan Amendments	1	2	3	4	5	6	7	8
Limit motorized recreation (corridors or routes) within BLM sensitive species habitat west of the UPRR tracks.	n/a	n/a		X				
Prohibit camping within BLM sensitive species habitat.	n/a	n/a	X					
Allow camping in designated areas within BLM sensitive species habitat.	n/a	n/a		X				X
Open BLM sensitive species habitat to all motorized recreation.	n/a	n/a					X	

Impacts to special status plant species from geothermal development would vary by alternative. Under Alternatives 1, 2, and 7, the majority of the Planning Area, 188,426 acres, would be available for geothermal development and, in turn, potential adverse impacts to special status species would be greater. Under these alternatives, there would be increased potential for the loss of vegetative resources, loss of habitat, disturbance of species, and potential direct mortality due to geothermal construction and development activities within the Planning Area (see Table 4-3).

Geothermal development would have the lowest potential adverse impacts under Alternative 3. Under this alternative, activities related to geothermal leasing would not be allowed within the Planning Area (Map 2-8). The elimination of surface-disturbing activities related to geothermal development under Alternative 3 would result in

beneficial effects to special status plant species. Potential adverse impacts within the Planning Area related to geothermal facilities and development would also be low under Alternative 4. Under this alternative, 188,426 acres of the Planning Area would be available for geothermal development but with an NSO stipulation (Map 2-9). The NSO stipulation under this alternative would result in beneficial effects in that no surface disturbance to potential special status plant habitat would likely occur.

Under Alternatives 5 and 6, geothermal development would be limited to 11,939 acres within the Planning Area (see Table 4-3 and Map 2-10). Under Alternative 8, geothermal leasing would be limited to 35,115 acres with 136,691 acres of NSO stipulation. Under Alternatives 5, 6, and 8 adverse impacts to special status species would be concentrated in a relatively small portion of the Planning Area (5 to 16 per cent, respectively). All exclusion areas or those with a NSO stipulation under these alternatives would result in beneficial effects to special status plant species.

OHV area designations would have the highest level of potential adverse impacts to special status species under Alternative 1. Under this alternative, the majority of the Planning Area, excluding the North Algodones Dunes Wilderness (26,098 acres), would be open or limited for OHV recreation, increasing the potential for loss of habitat, disturbance of species communities, and potential direct mortality from OHV recreation activities. Under Alternatives 7 and 8, adverse impacts would be similar to those under Alternative 1; however, 36,743 and 35,144 acres, respectively, would be closed to OHV recreation under these alternatives, protecting 10,645 and 9,046 more acres than Alternative 1. Areas closed to OHV recreation would result in beneficial effects to special status species through the elimination or reduction in the loss of habitat, disturbance of species, and direct mortality from OHV recreation.

Under Alternatives 2 and 3, the greatest number of acres (75,322 and 87,778 acres, respectively) would be closed to OHV recreation. Motorized travel would not be authorized within proposed closed OHV management areas, and loss of habitat, disturbance of species communities, and potential direct mortality from OHV recreation would no longer occur, resulting in beneficial effects to special status species. Under Alternatives 4, 5, and 6, adverse impacts to wildlife resources would be greater than under Alternatives 2 and 3 but less than under Alternatives 1, 7, and 8 (see Table 4-3).

Under Alternatives 1, 2, and 7, lands available for solar and wind development would be the highest, resulting in greater potential adverse impacts to special status species. Under these alternatives, 188,833 acres would be available for solar and wind development (see Table 4-3 and Maps 2-29 and 2-33), resulting in potential loss of habitat, disturbance of species, and possible direct mortality. Adverse impacts to special status species from solar and wind development would be the lowest under Alternatives 3 and 8 as these alternatives reduce the number of acres available for development. Under these alternatives, development would not be authorized and loss of habitat,

disturbance of species, and direct mortality from development related surface-disturbing activities would not occur, resulting in a beneficial effect on special status species.

Under Alternatives 4, 5, and 6, there would be 144,290 acres of land designated as avoidance areas. An avoidance area is defined as an area to be avoided but may be available for location of right-of-ways with special stipulations. Designation of avoidance areas would likely reduce the potential impacts related to surface-disturbing activities on special status species, resulting in a beneficial effect overall.

For each of the alternatives, potential adverse impacts of OHV recreation to Colorado Desert fringe-toed lizards and flat-tailed horned lizards were considered in detail. For these species, it is assumed that all areas of psammophytic scrub and creosote bush scrub are occupied habitat. Under Alternative 1, the majority of habitat for these species would be open or limited to OHV recreation (about 78 percent of the Planning Area), potentially resulting in loss or displacement of species. Under Alternatives 2 and 3, the highest number of acres would be closed to OHV recreation (30 to 34 percent of the Planning Area), resulting in lessened adverse impacts and beneficial effects to these species. Under Alternatives 4, 5, 6, and 7, and 8 adverse impacts to species and habitat would be similar to those discussed under Alternative 1, although more acres of the psammophytic scrub vegetation community would be closed to OHV recreation under these alternatives, protecting additional acres of important habitat for these species and resulting in beneficial effects overall.

Management for flat-tailed horned lizard in the East Mesa ACEC under all alternatives would result in beneficial effects to this species as well as several other special status species through the protection of habitat, monitoring of resources, and restoration treatments.

4.7.5 Irreversible and Irretrievable Commitment of Resources

Implementation of the Proposed RAMP/CDCA Plan Amendment would result in surface-disturbing activities (e.g., mineral, energy, ROWs, and recreation activities) that would cause irreversible or irretrievable commitment of resources related to special status species. Surface-disturbing activities may irreversibly alter soils, result in the loss of vegetation, and disturb or destroy habitat for special status species.

4.7.6 Unavoidable Adverse Impacts

Renewable energy development within the Planning Area (see Table 4-2) would result in long-term unavoidable impacts to special status species, primarily in the form of habitat disturbance and loss caused by development projects. Mitigation measures to minimize these impacts would be required; however, permanent loss of special status species

habitat would occur. Project level analysis would be required on a case-by-case basis for these proposed projects, and ESA Section 7 consultation would also be required if federally listed species may be affected.

BLM law enforcement or emergency search and rescue activities occurring in areas supporting special status species could result in unavoidable adverse impacts through trampling and disturbance.

4.7.7 Short-term Use and/or Long-term Productivity

Habitat converted to permanent facilities or structures would result in a net loss of special status species habitat as long as those facilities or structures remain in use. Mitigation measures to minimize these impacts would be required; however, permanent impacts to special status species habitat may occur.

4.7.8 Cumulative Impacts

4.7.8.1 Geographic Extent

The assessment area for cumulative impacts to special status species is the Planning Area, critical habitat boundaries within and adjacent to the Planning Area, and existing ranges within the Planning Area. The existing condition for special status species in the Planning Area, which represents the aggregate effect of past and present actions impacting these species, is described in Chapter 3, Section 3.7. In general, actions within the Planning Area are not expected to affect adjacent lands; on the contrary, management actions that avoid or minimize impacts to vegetation and wildlife resources overall may also result in the protection of special status species habitat and populations on adjacent lands.

Within the vicinity of the Planning Area, the Salton Sea Restoration Plan, the Coachella Valley Water Management Plan and the Imperial Irrigation District Water Conservation and Transfer Project and Habitat Conservation Plan each have the potential for surface disturbance causing habitat and species loss. However, these plans also include measures to minimize impacts to species as well as conserve habitat. Overall, cumulative impacts to special status species from these plans along with the ISD RAMP would be minimal.

Also in the vicinity of the Planning Area is the Mesquite Mine. This mine has created some loss of habitat to the desert tortoise. The mine has a program to physically relocate tortoise that may be impacted by the mining operations to a different location. Cumulative impacts to desert tortoise from the Mesquite Mine along with the ISD RAMP would likely be minimal.

Development of roadways, ROWs, and facilities within the Planning Area and vicinity (see Table 4-2) has resulted in habitat degradation or loss, as well as mortality, of special status species. These activities are likely to persist in the Planning Area and surrounding areas into the foreseeable future. Continued recreational use of the Planning Area has also resulted in adverse cumulative impacts to special status species and will persist into the foreseeable future.

Roads and highways pose several direct and indirect threats to populations. Roads and highways are considered the greatest cumulative threat to tortoise populations and may also impact other special status wildlife species. As barriers, roads inhibit dispersal and subsequent gene flow between subpopulations and metapopulations. In providing access to species populations, particularly tortoise, roads and highways foster such threats as development, vandalism, and collecting. Increased diversity and productivity of vegetation resulting from enhanced hydrological conditions along roadway edges attracts wildlife and thereby places them at a greater risk of direct mortality from both predators and motorized vehicles. Roadkills are a substantial source of mortality for many wildlife species, including special status species (Boarman et al. 1997).

The paving and expansion of road networks could adversely impact special status species due to increased volume of vehicle travel at higher speeds. Much of the habitat within microphyll woodlands and wash-dissected creosote scrub are sustained by sheet flow. As barriers in the form of roadway development occur, water flow patterns are disturbed. Rain events are more likely to pool up and evaporate in roadway depressions and tracks or collect adjacent to the ROW. Flows may be permanently interrupted and no longer feed certain vegetation communities.

The presence of humans, their activities, and noise decreases habitat suitability for special status species. Increased dispersal camping and/or day use may cause loss of vegetation, which also result in cumulative impacts on special status species.

4.7.8.2 Reasonably Foreseeable Projects

Table 4.1 provides a list of current and reasonably foreseeable projects, including proposed renewable energy projects, various BLM-authorized actions, and other actions that may be considered. Most projects have either undergone independent environmental review pursuant to NEPA (and in some cases pursuant to the California Environmental Quality Act) or will do so prior to approval. The reasonably foreseeable projects that may affect special status species are listed in Table 4.1.

4.7.8.3 Cumulative Impact Differences between Alternatives

Potential renewable energy (geothermal, solar, and wind) leasing within the Planning Area would result in the greatest adverse impacts to PMV under Alternatives 1, 2, and 7.

Under these alternatives, PMV critical habitat would not be excluded from renewable energy development surface occupancy. Under Alternatives 5 and 6, PMV critical habitat would have minimal impacts. Under these alternatives, five percent of the Planning Area would be available for geothermal leasing and surface occupancy (see Table 4-3). Under Alternatives 4, 5, and 6, portions of PMV critical habitat would be designated as avoidance areas, impacts could occur; however, impacts would likely be minimal due to the avoidance area designation. Under Alternatives 3 and 8, no renewable energy development would be allowed within PMV critical habitat. No cumulative impacts to PMV from renewable energy development would be expected under these alternatives. The current reasonably foreseeable solar energy project application is located outside of PMV critical habitat and known occupied habitat, therefore, no cumulative impacts to PMV from this project would occur.

For desert tortoise, impacts from lands available for geothermal development would be greatest under Alternatives 1, 2, 7, and 8 because all desert tortoise habitat along the eastern portion of the Planning Area (east of the UPRR tracks) would be available for geothermal development and surface occupancy (see Table 4-3). Under Alternatives 5 and 6, impacts from lands available for geothermal development to desert tortoise would be minimal as only a small portion of the Planning Area would be available (with surface occupancy) for geothermal leasing. Under Alternatives 3 and 4, there would be no impacts to desert tortoise from lands available for geothermal development as these alternatives would not allow development or include NOS stipulations. Geothermal development is not reasonably foreseeable to occur within the Planning Area, therefore, no cumulative impacts to desert tortoise would occur.

OHV recreation within the Planning Area would continue to impact special status species. For PMV, OHV recreation would have the highest potential impacts under Alternatives 1, 2, 4, 6, and 7, with the greatest impacts under Alternative 6 and the lowest under Alternative 3. The least impacts from OHV recreation would occur under Alternative 8. Under this alternative, all of PMV critical habitat would be closed to OHV recreation.

OHV recreation would likely continue to have minimal impacts on desert tortoise within the Planning Area. Under all alternatives, desert tortoise habitat within the Planning Area would continue to be designated as limited to OHV recreation. Recreational activities would be reasonably foreseeable to continue within all areas open to OHV recreation, resulting in minor cumulative impacts to PMV outside of critical habitat (within areas known to be occupied within open OHV recreation areas) under all alternatives.

Under Alternatives 1, 2, and 7, lands available for solar and wind development would be the highest, resulting in greater potential impacts to desert tortoise. Under Alternatives 3, 4, 5, 6, and 8 the majority of tortoise habitat would also be available for solar and wind development, resulting in potential impacts to desert tortoise.

The USBP frequently uses the Planning Area and other desert areas in the vicinity for surveillance and apprehension of undocumented immigrants. These activities result in surface disturbance, as well as habitat and species loss, which would result in cumulative impacts to special status species. These impacts would be similar for all alternatives.

4.7.9 Mitigation Measures

Management actions to reduce impacts to special status species are included under all alternatives in Chapter 2 (Section 2.3.8). These measures include monitoring of special status species habitat and populations, and restoration of damaged or disturbed areas. These measures would avoid, minimize, and mitigate impacts to special status species in the Planning Area.

4.8 Impacts on Wildland Fire

Primary impacts to wildland fire are characterized as those actions that limit or enhance the ability to suppress fire, or that alter naturally occurring fire regimes. Actions that enhance the ability to suppress fire include, but are not limited to, vegetation and invasive species removal. Nearby community fire departments, such as Imperial County or Winterhaven, are the primary fire protection agencies for BLM-administered lands in the Planning Area.

Continued use of the existing communication sites and utility ROWs and potential reasonable foreseeable development of any lands and realty-related uses is expected to temporarily affect fuels and fire because of ground disturbance and increased opportunities for accidental human caused-ignition during construction, operation, and maintenance. More improvements and structures would do the following:

- Affect suppression and costs by placing more on-the-ground features that could require protection from a wildfire
- Present more hazards, such as flight hazards from overhead power lines or explosion hazards of buried gas pipelines
- Create restrictions to prescribed burning

ROWs, utility corridors, and other such authorizations inadvertently create fuel breaks and provide access routes for wildfire suppression. stipulations specific to each authorization reduces the potential threat of accidental ignition of wildfires during construction or maintenance.

Areas with more potential development and recreation use could affect fire management by increasing the risk of accidental human-caused ignitions. Increased visitation, camping, and OHV recreation increases potential for cigarettes, campfires, and sparks emitted by OHVs to ignite fires.

International border issues such as undocumented immigration, illegal drug trafficking, and associated crime result in increased potential of human caused fire, which in turn raise the risk to firefighter safety.

4.8.1 Differences between Alternatives

Under Alternatives 1 and 2, the CDCA Plan would not be amended. Wildland Fire management actions under Alternatives 3 through 8 would not require a CDCA Plan Amendment; management actions would remain in compliance with the CDCA Plan.

Impacts to wildland fire management would be similar under each of the alternatives. Fire hazards are limited within the Planning Area and wildland fires are rare.

4.8.2 Irreversible and Irretrievable Commitment of Resources

Implementation of the Proposed RAMP/CDCA Plan Amendment would not likely result in irreversible and irretrievable commitment of resources related to wildland fire.

4.8.3 Unavoidable Adverse Impacts

Areas designated for the protection of sensitive cultural and natural resources are managed to limit wildland fire potential. Management of these areas may also include stipulations that limit the ability to suppress wildland fire, which would result in potential unavoidable adverse impacts to wildland fire control and management within the Planning Area.

4.8.4 Short-term Use and/or Long-term Productivity

There would be no short-term uses that would likely result in wildland fire that would impact long-term productivity of the resource as fire in the Planning Area is rare.

4.8.5 Cumulative Impacts

4.8.5.1 Geographic Extent

The geographic extent for cumulative impacts on wildland fire management is the Planning Area and vicinity. The existing condition for wildland fire in the Planning Area,

which represents the aggregate effect of past and present actions impacting wildland fire, is described in Chapter 3, Section 3.8. In general, actions within the Planning Area are not expected to affect adjacent lands; quite on the contrary, management actions that reduce the potential for wildland fires (e.g., invasive plant species management, campfire management) would also minimize the potential for wildland fires within adjacent areas.

4.8.5.2 Reasonably Foreseeable Projects

Table 4.1 provides a list of current and reasonably foreseeable projects, including proposed renewable energy projects, various BLM-authorized actions, and other actions that may be considered. Most projects have either undergone independent environmental review pursuant to NEPA (and in some cases pursuant to the California Environmental Quality Act) or will do so prior to approval. The reasonably foreseeable projects that may affect wildland fire are listed in Table 4.1.

4.8.5.3 Cumulative Impact Differences between Alternatives

Wildland fires are rare within the Planning Area. All alternatives include measures to minimize the spread of invasive plant species that promote the spread of fire. Overall, there would be minimal cumulative impacts related to wildland fire management under all alternatives.

4.8.6 Mitigation Measures

Mitigation measures and BMPs related to wildland fire outlined under all action alternatives in Chapter 2 (Section 2.3.9) would assist in minimizing the potential for fire and reduce impacts.

4.9 Impacts on Cultural Resources

Cultural resources (also referred to as heritage resources) are subject to a variety of impacts as a result of the multiple uses that occur on BLM land. Primary concern is typically focused on the potential for adverse impacts; however, beneficial impacts could also occur as a result of management decisions. For the purposes of this document, adverse impacts are characterized as actions that result in the loss, destruction, or degradation of significant cultural resources. Significant resources are those that are eligible for nomination to the NRHP or those that have been placed on the register. Unevaluated cultural resources are assumed to be eligible for nomination to the NRHP for the purposes of cultural resource management decisions.

Significant heritage resources are referred to as historic properties by agencies such as the SHPO and the NRHP. These are typically historic structures, historic sites, or prehistoric archaeological sites. A number of other types of heritage resources exist: historic districts, archaeological districts, traditional cultural properties, and cultural landscapes. Since heritage resources are finite and non-renewable, prevention of adverse impacts is always preferred. The analysis of potential impacts to cultural resources, both adverse and beneficial, was based on review of existing literature and the expertise of BLM resource specialists.

Land managers have multiple ways to try to minimize impacts to heritage resources. These measures are based on the kinds of threats to the resources and the natural environment of the site. For example, if OHVs are running over a site, managers could try to re-route traffic away from the site, place post and cable barriers around the site, fence the site, or close the area to vehicular traffic. If camping is impacting a site, the site could be fenced, signed, and interpreted for the public.

Many changes in land use and permitted new uses are considered undertakings under NEPA and the NHPA. In these cases, impacts to heritage resources are considered in the permit process. If adverse impacts cannot be avoided, then the cultural resource may be excavated as part of a data recovery plan to gather information before damage occurs. Sometimes off-site mitigation measures are conducted. This might require additional archival research and additional ancillary studies (e.g., pollen studies, trace protein analysis, thermoluminescence dating). In addition to these or instead of them, on Historic Period sites, an oral history program might be conducted along with additional archival research.

BLM land use decisions that authorize surface-disturbing activities may result in adverse impacts to cultural resources. Resources could be disturbed, exposed, or lost during these activities. Compliance with Section 106 of the NHPA and other applicable cultural resource laws and regulations would be completed before implementing specific projects resulting from Proposed RAMP/CDCA Plan Amendment decisions. Direct impacts on cultural resources are typically related to the level of ground disturbance associated with a project. Ground disturbance, whether for facilities improvements or other activities, is the primary factor affecting archaeological sites and sites with Native American heritage values. Indirect impacts are less associated with the intentional changes being produced by the project. These could include such things as changes to or new travel access routes that lead to greater access to an area, thus increasing the potential for illegal collecting by the public. Erosion-control measures that alter deposition patterns and lead to greater erosion or sedimentation could also indirectly affect cultural resources.

Examples of ground-disturbing actions that would need project specific NEPA documentation and compliance with cultural resource laws and regulations include proposed communication sites, ROWs, recreation area improvements, habitat restoration, road construction and improvements, and others. Potential impacts (direct

and indirect) to cultural resources are categorized below and divided into destruction or degradation and beneficial.

The following assumptions were made in determining impacts resulting from the proposed alternatives:

- The current cultural resources database for the Planning Area is representative of the range of resources present, even though only a small portion of the Planning Area has been surveyed for cultural resources.
- Ground disturbance that affects cultural resources could cause irreversible damage to these nonrenewable resources.
- Owing to the nature of shifting sands, and particularly their depth, regardless of the level of inventory, some resources may not be identified.
- Greater access to an area through time could present more opportunities for illegal artifact collection, as well as more ground disturbance.
- Conversely, reduced access over time could produce beneficial impacts by reducing opportunities for unauthorized artifact collection, and reduced ground disturbance.

Employing these assumptions, and what is currently known of the cultural resources of the Planning Area, extrapolations were made below regarding the extent of impact to cultural resources that would result from proposed alternatives.

4.9.1 Direct and Indirect Impacts to Cultural Resources

Loss or degradation of NRHP-listed or eligible cultural resources could occur from natural deterioration (such as that caused by water or wind erosion), human-caused damage (such as the results of OHV recreation or camping on archeological sites), or illegal collecting. Loss of a cultural resource is defined as the physical destruction of the integrity of the resource. The criteria of NRHP significance are dependent upon integrity. Degradation occurs when changes to cultural properties' significance or preservation value occurs.

Potential beneficial impacts to cultural resources are likely to occur as a result of BLM special designations. Management guidance and directions for the designated wilderness and ACECs would provide benefits to cultural resources from restricting certain degrading activities and practices. Heritage sites that are located within ACECs would have additional protection from impacts that could be caused by mineral resource activities. The wilderness within the Planning Area is statutorily closed to motorized equipment, mechanized transport use, and withdrawn from mineral entry, except valid

existing rights. These restrictions result in fewer visitations and fewer adverse impacts to heritage resources from visitation.

Any ground-disturbing activity has the potential to cause the loss and/or degradation of archaeological sites or other cultural resources. For example, vegetation management and treatment methods typically have detrimental effects on heritage resources; however, these interactions are complex. Eliminating invasive plant species and the fuel load near heritage sites could result in beneficial effects by reducing the chance of wildfire impacting these sites.

Geothermal development can include multiple production and injection wells installed on pads that vary from 1 to 5 acres in size. Although they require less land for the plant itself, water-cooled geothermal systems need a continuous supply of water and create vapor plumes. Pipelines are constructed above ground, on supports, to transport geothermal fluids. Geothermal facilities can also include fencing, off-site access roads and transmission lines, ancillary buildings, water storage and discharge facilities, as well as drilling rigs or derricks and associated support facilities (Office of Indian Energy and Economic Development 2009a). Impacts to cultural resources associated with geothermal development could include the loss and/or degradation of archaeological sites or other cultural resources.

Wildlife improvements in the Planning Area mainly consist of wildlife guzzler projects. Wildlife guzzlers tend to alter travel patterns and concentrate wildlife in areas. Destruction, trampling, or displacement of surface artifacts may result from concentrated use, causing loss of context, or loss of features.

Direct impacts from fire and fire suppression activities could result in the damage or destruction of sites and associated artifacts; destruction of organic materials such as bone, plant, and animal fibers, and wooden elements; and destruction or chemical alteration of materials used to date sites, such as charcoal.

Mineral resource actions, including sand and gravel and geothermal leasing, result in surface disturbance activities that could cause the destruction and/or degradation of cultural resources.

Unauthorized cross-country travel could inadvertently damage sites from surface disturbance or provide vehicular access to previously remote areas, which may result in artifact collection, breakage, displacement, vandalism, and illegal artifact collection.

Utility-scale solar energy development can include commitment of a large land area for both PV and CSP systems. This land area would be used for the solar systems themselves (whether PV or CSP), ancillary buildings, water storage and discharge facilities, fencing, access roads, and offsite facilities such as a central power management facility with transmission and grid connections. The land disturbance would

be greater for PV (9 acres per MW versus 5 acres per MW for CSP) due to the interconnectedness of the blocks of solar arrays and the lower efficiency rates. However, water use would be considerably greater for CSP, as PV uses minimal water (Office of Indian Energy and Economic Development 2009b). As with solar energy development, wind energy development can include commitment of a large land area. This land area would be used for the wind turbines themselves (which can range from 200 to 300 feet in height), ancillary facilities, fencing, access roads, and a central power management facility with transmission and grid connections (Office of Indian Energy and Economic Development 2009c). Impacts to cultural resources associated with solar and wind energy development could include the loss and/or degradation of archaeological sites or other cultural resources.

Discretionary and construction actions, such as road building, ROWs, mineral activities, renewable energy development, and certain recreational activities, such as OHV recreation, would involve ground-disturbing actions that could cause the destruction and/or degradation of cultural resources, particularly if the resource was subsurface and previously undetected. These activities could also result in the discovery of an otherwise undetectable resource and would undergo Section 106 consultation during the site-specific NEPA analysis and documentation conducted to authorize the site-specific action.

Land acquisitions provide additional management consideration and protection of cultural resources in the Planning Area. Land acquisition would have a beneficial effect on any cultural resources that exist within the acquired property.

4.9.2 Differences between Alternatives

Under Alternatives 1 and 2, the CDCA Plan would not be amended. Cultural resource management actions under Alternatives 3 through 8 would not require a CDCA Plan Amendment; management actions would remain in compliance with the CDCA Plan.

There should be little difference between alternatives in terms of direct impacts to cultural resources because these impacts would be avoided or otherwise mitigated pursuant to the NHPA, NEPA, and other federal mandates. There may be some differences, however, with regard to indirect loss or degradation because alternatives vary in the sizes of protection-oriented management decisions. The primary differences among the alternatives would be the acreage made available to geothermal leasing, OHV recreation, and solar and wind energy development (see Table 4-3). Any authorized action would have low to no potential for adversely impacting cultural resources, and the actions of other agencies would be in compliance with Section 106. In general terms, reducing the levels of these activities also reduces the likelihood of adverse impacts to cultural resources. The protection or avoidance of cultural resources would result in beneficial effects to these resources.

The following discussion provides a ranking based on their potential for ground disturbance (see Table 4-3). Under this ranking, the assessment of the relative potential of an alternative to affect cultural resources is based on the premise that the greater the degree of access for OHV recreation and the greater the area of potential surface disturbance, the greater the potential would be for adverse effects. Due to limitations in the existing data, this approach does not take into consideration resource significance, site type and complexity, or variations in resource densities.

Impacts to cultural resources from geothermal leasing would vary by alternative. Under Alternatives 1, 2, and 7, the majority of the Planning Area, 188,426 acres, would be available for geothermal leasing and, in turn, potential adverse impacts to cultural resources would be greater. Under these alternatives, there would be increased potential for destruction and/or degradation of cultural resources due to geothermal construction and development activities within the Planning Area (see Table 4-3).

Geothermal leasing would have the lowest potential adverse impacts under Alternative 3. Under this alternative, activities related to geothermal leasing would not be allowed within the Planning Area (Map 2 -8). Under this alternative, exclusion of surface-disturbing activities related to geothermal development would result in the protection of cultural resources and beneficial effects to these resources.

Potential adverse impacts within the Planning Area related to geothermal facilities and development would also be low under Alternative 4. Under this alternative, 188,426 acres of the Planning Area would be available for geothermal leasing but with an NSO stipulation (Map 2 -9). The NSO stipulation under this alternative would result in beneficial effects in that no disturbance to potential cultural resources would likely occur. However, adverse impacts related to construction and development of geothermal facilities would occur outside the Planning Area, where cultural resources may occur.

Under Alternatives 5 and 6, geothermal leasing would be limited to 11,939 acres within the Planning Area (see Table 4 -3 and Map 2 -10). Under Alternative 8, geothermal leasing would be limited to 35,115 acres with 136,691 acres of NSO stipulation. Under Alternatives 5, 6, and 8 adverse impacts to cultural resources would be concentrated in a relatively small portion of the Planning Area (5 to 16 percent). All areas closed or with a NSO stipulation under these alternatives would result in beneficial effects to cultural resources.

OHV area designations would have the highest level of potential adverse impacts to cultural resources under Alternative 1. Under this alternative, the majority of the Planning Area, excluding the North Algodones Dunes Wilderness (26,098 acres), would be open or limited OHV recreation, increasing the potential for destruction and/or degradation of cultural resources from OHV recreation activities. Under Alternatives 7 and 8, adverse impacts would be similar to those under Alternative 1; however, 36,743 and 35,144 acres, respectively, would be closed to OHV recreation under these alternatives,

protecting 10,645 and 9,046, respectively, more acres than Alternative 1. Designating areas as closed to OHV recreation would result in beneficial effects to cultural resources through the elimination or reduction in the disturbance or loss of these resources from OHV recreation.

Under Alternatives 2 and 3, the greatest number of acres (75,322 and 87,778 acres, respectively) would be closed to OHV recreation. Motorized travel would not be authorized within proposed closed OHV management areas, destruction and/or degradation of cultural resources from OHV recreation would no longer occur, resulting in beneficial effects to these resources. Under Alternatives 4, 5, and 6, adverse impacts to cultural resources would be greater than under Alternatives 2 and 3 but less than under Alternatives 1, 7, and 8 (see Table 4-3).

Under Alternatives 1, 2, and 7, lands available for solar and wind leasing would be the highest, resulting in greater potential adverse impacts to cultural resources. Under these alternatives, 188,833 acres would be available for solar and wind development, except the wilderness (see Table 4-3 and Maps 2-29 and 2-33), resulting in potential destruction and/or degradation of cultural resources. Under Alternatives 3 and 8, only 47,131 and 27,606 acres, respectively, would be available for solar and 35,115 acres for wind lease and development (see Table 4-3 and Maps 2-30, 2-32, 2-34 and 2-36), resulting in a lower potential for destruction and/or degradation of cultural resources. Under these alternatives, designating exclusion areas for solar and wind development would result in beneficial effects to cultural resources through the reduction or elimination of resource loss and destruction due to surface-disturbing activities.

Under Alternatives 4, 5, and 6, there would be 144,290 acres of land designated as avoidance areas. An avoidance area is defined as an area to be avoided but may be available for location of right-of-ways with special stipulations. Designating avoidance areas would likely reduce the potential impacts related to surface-disturbing activities on cultural resources, resulting in a beneficial effect overall. However, cultural resources may be adversely impacted under these alternatives if solar and wind energy proposals have no other reasonable location. Under these alternatives, the wilderness would continue to be excluded.

4.9.3 Irreversible and Irretrievable Commitment of Resources

Implementation of the Proposed RAMP/CDCA Plan Amendment would not likely result in irreversible or irretrievable commitment of cultural resources.

4.9.4 Unavoidable Adverse Impacts

Because cultural resources are nonrenewable, the removal or destruction of any resource results in a net loss of resources. Unavoidable adverse impacts on cultural resources, however, are not anticipated to occur as a result of implementing the Proposed RAMP/CDCA Plan Amendment.

4.9.5 Short-term Use and/or Long-term Productivity

Implementation of the Proposed RAMP/CDCA Plan Amendment would result in surface-disturbing activities (e.g., mineral, energy, ROWs, and recreation activities) that could result in adverse impacts to cultural resources. However, it is not anticipated that there would be short-term uses of cultural resources that would impact long-term productivity. Mitigation measures to minimize potential impacts to cultural resources would be required for development projects.

4.9.6 Cumulative Impacts

4.9.6.1 Geographic Extent

The geographic extent (assessment area) for cumulative impacts on cultural resources management is the Planning Area. The existing conditions for cultural resources within the Planning Area, which represents the aggregate effect of past and present actions impacting soil resources, are described in Chapter 3, Section 3.9. In general, actions within the Planning Area are not expected to affect cultural resources on adjacent lands.

Cultural resources on public lands may be affected by present and future off-site use and development under all alternatives, including the Proposed Plan and CDCA Plan Amendment. Incremental loss of cultural resources would continue due to natural processes and inadvertent or intentional damage from casual use and various recreational activities (e.g., OHV recreation, camping) within the Planning Area. Important cultural resource sites tend to overlap with established ROW corridors and popular recreation destinations. Cumulative impacts to cultural resources may occur due to an increase in demand for multiple uses within areas that are known to contain important cultural resource values.

Potential developments within the Planning Area would cumulatively affect the visual setting and integrity of feeling for cultural resources on BLM lands. Major ROWs, particularly power line corridors or renewable energy developments, have an effect on the viewsheds for important cultural sites on the landscape. Future developments, including energy and transportation ROWs, have the potential to directly impact, damage, or destroy cultural resources. The net loss of these cultural resources from development affects the overall cultural resource values of the landscape. Any actions

by BLM, other federal agencies, or project proponents that occur on federal lands would require compliance with Section 106 of the NHPA, requiring an analysis of potential cumulative impacts to cultural resources.

4.9.6.2 Reasonably Foreseeable Projects

Table 4.1 provides a list of current and reasonably foreseeable projects, including proposed renewable energy projects, various BLM-authorized actions, and other actions that may be considered. Most projects have either undergone independent environmental review pursuant to NEPA (and in some cases pursuant to the California Environmental Quality Act) or will do so prior to approval. The reasonably foreseeable projects that may affect cultural resources are listed in Table 4.1.

4.9.6.3 Cumulative Impact Differences between Alternatives

Potential impacts to cultural resources from lands available for geothermal leasing would be least under Alternatives 3 and 4. Under these alternatives, either no acres would be available for geothermal development or NSO stipulations would apply. Impacts under Alternatives 1, 2, 5, 6, 7 and 8 would be similar among themselves with varying amounts of acres available for geothermal development, resulting in a greater potential for cumulative impacts to cultural resources (see Table 4.2). Under Alternatives 1, 2, and 7, 188,462 acres would be available for geothermal leasing. Under Alternatives 5 and 6, 11,939 acres would be available for geothermal leasing. Under Alternative 8, 35,115 acres would be available for geothermal leasing. Geothermal leasing has the potential to contribute to cumulative impacts to cultural resources. However, there are currently no geothermal lease applications within the Planning Area and, as there are no reasonably foreseeable leases, no cumulative impacts to cultural resources from these actions can be anticipated.

The past and present development and public uses of recreational sites in the Planning Area have resulted in impacts to cultural resources. Under Alternatives 2 and 3, the most acres would be closed to OHV recreation, resulting in the lowest potential impacts from OHV recreation to cultural resources. Under Alternatives 1, 4, 5, 6, 7, and 8, impacts from recreation would be similar among them overall and greater than under Alternatives 2 and 3 (see Table 4-3). Cumulatively, recreational activities would be reasonably foreseeable to continue within all areas open to OHV recreation, resulting in minor cumulative impacts to cultural resources.

Cumulative impacts from solar and wind energy development to cultural resources would be lowest under Alternatives 3 and 8, which propose the fewest acres available for wind and solar development within the Planning Area. Cumulative impacts under Alternatives 1, 2, 4, 5, 6, and 7 would be similar among them, with varying amounts of acres

available or with NSO stipulations for wind and solar development, resulting in a greater potential for cumulative impacts to cultural resources (see Table 4-3).

Cumulative impacts from law enforcement or emergency search and rescue activities, including USBP activities, would continue to result in soil compaction and erosion, which would be a cumulative impact. These impacts would be similar for all alternatives.

4.9.7 Mitigation Measures

Mitigation measures and BMPs related to cultural resources outlined under all action alternatives in Chapter 2 (Section 2.3.10) would assist in minimizing impacts to cultural resources. These measures, along with measures incorporated into present and foreseeable actions, would avoid, minimize, and mitigate potential impacts to cultural resources.

4.10 Impacts on Paleontological Resources

Potential paleontological resources within the Planning Area would be susceptible to impacts from vegetation treatments, mining and mineral extraction activities, recreation, OHV/transportation uses, land use authorizations, and land tenure decisions. These impacts could lead to the disturbance, destruction, or loss of paleontological resources. Protective land use designations such as the wilderness, ACECs, and closed OHV management areas would have coincidental beneficial impacts by protecting known and unknown paleontological resources. Any BLM-authorized action would have low to no potential for impacting paleontological resources within the Planning Area.

4.10.1 Loss or Degradation of Paleontological Resources

Loss or degradation of vertebrate paleontological resources and scientifically significant invertebrate and plant fossil resources could occur from natural or human-caused deterioration, or potential conflict with other resource uses.

Ground- and subsurface-disturbing activities would have the potential to cause the inadvertent loss and/or degradation of vertebrate paleontological resources and scientifically significant invertebrate and plant fossil resources. Discretionary and construction actions, such as mineral activities, recreational facilities, road building, and ROWs, would involve excavation or ground disturbance that could cause the inadvertent loss and/or degradation of vertebrate paleontological resources and scientifically significant invertebrate and plant fossil resources. These activities could also result in the discovery of an otherwise undetected resource.

Geothermal development can include multiple production and injection wells installed on pads that vary from 1 to 5 acres in size. Although they require less land for the plant itself, water-cooled geothermal systems need a continuous supply of water and create vapor plumes. Pipelines are constructed above ground, on supports, to transport geothermal fluids. Geothermal facilities can also include fencing, off-site access roads and transmission lines, ancillary buildings, water storage and discharge facilities, as well as drilling rigs or derricks and associated support facilities (Office of Indian Energy and Economic Development 2009a). Impacts to paleontological resources associated with geothermal development could include the loss and/or degradation of vertebrate paleontological resources and scientifically significant invertebrate and plant fossil resources.

Loss or degradation of vertebrate paleontological resources and scientifically significant invertebrate and plant fossil resources would be minimal in the wilderness and ACECs designated to protect sensitive resource values. Exclusion and avoidance areas would help to direct projects into areas that would have reduced impact on vertebrate paleontological resources and scientifically significant invertebrate and plant fossil resources. The management objectives of VRM classes I and II strive to preserve or retain the existing characteristic landscape, so they could provide coincidental benefits to vertebrate paleontological resources and scientifically significant invertebrate and plant paleontological localities.

Utility-scale solar energy development can include commitment of a large land area for both PV and CSP systems. This land area would be used for the solar systems themselves (whether PV or CSP), ancillary buildings, water storage and discharge facilities, fencing, access roads, and offsite facilities such as a central power management facility with transmission and grid connections. The land disturbance would be greater for PV (9 acres per MW versus 5 acres per MW for CSP) due to the interconnectedness of the blocks of solar arrays and the lower efficiency rates. However, water use would be considerably greater for CSP, as PV uses minimal water (Office of Indian Energy and Economic Development 2009b). As with solar energy development, wind energy development can include commitment of a large land area. This land area would be used for the wind turbines themselves (which can range from 200 to 300 feet in height), as well as ancillary facilities, fencing, access roads, and a central power management facility with transmission and grid connections (Office of Indian Energy and Economic Development 2009c). Impacts to paleontological resources associated with solar and wind energy development could include the loss and/or degradation of vertebrate paleontological resources and scientifically significant invertebrate and plant fossil resources.

Land acquisitions provide additional management consideration and protection of vertebrate paleontological resources and scientifically significant invertebrate and plant fossil resources in the Planning Area. Land acquisition would have a beneficial effect on

any vertebrate paleontological resources and scientifically significant invertebrate and plant fossil resources that exist within the acquired property.

4.10.2 Differences between Alternatives

Under Alternatives 1 and 2, the CDCA Plan would not be amended. Paleontological resource management actions under Alternatives 3 through 8 would not require a CDCA Plan Amendment; management actions would remain in compliance with the CDCA Plan.

Differences in impacts to vertebrate paleontological resources and scientifically significant invertebrate and plant fossil resources would potentially vary by alternative as the amount of surface disturbance varies. Alternatives providing more acreage for OHV recreation, camping, construction activities, as well as renewable energy and geothermal leasing activities would result in greater adverse impacts (see Table 4-3). Alternatives providing fewer acres for these activities would result in greater beneficial effects from resource protection. Differences in impacts to vertebrate paleontological resources and scientifically significant invertebrate and plant fossil resources by alternative would be similar to those outlined in Section 4.9.2 for Cultural Resources above.

4.10.3 Irreversible and Irretrievable Commitment of Resources

Implementation of the Proposed RAMP/CDCA Plan Amendment would not likely result in irreversible or irretrievable commitment of paleontological resources.

4.10.4 Unavoidable Adverse Impacts

No unavoidable adverse impacts on vertebrate paleontological resources and scientifically significant invertebrate and plant resources are anticipated to occur as a result of implementing the Proposed RAMP/CDCA Plan Amendment.

4.10.5 Short-term Use and/or Long-term Productivity

Implementation of the Proposed RAMP/CDCA Plan Amendment would result in ground-disturbing activities (e.g., mineral, energy, ROWs, and recreation activities). Surface-disturbing activities may cause direct adverse impacts to paleontological resources through the damage or destruction of fossils or the disturbance of the stratigraphic context in which they are located. Indirect adverse impacts may be created from increased accessibility to fossils leading to looting or vandalism activities. Mitigation measures to minimize potential impacts to paleontological resources would be required for development projects.

4.10.6 Cumulative Impacts

4.10.6.1 Geographic Extent

The geographic extent (assessment area) for cumulative impacts on paleontological resources management is the Planning Area. The existing conditions for paleontological resources within the Planning Area, which represents the aggregate effect of past and present actions impacting paleontological resources, are described in Chapter 3, Section 3.10. In general, actions within the Planning Area are not expected to affect paleontological resources on adjacent lands.

Cumulative impacts to paleontological resources may occur through natural processes and inadvertent or intentional damage from OHV recreation, casual use mineral exploration, and recreational collecting of common invertebrate and plant fossils. An increase in renewable energy development has the potential to adversely impact paleontological resources. Any actions by other agencies would require compliance with NEPA, requiring an analysis of potential impacts to paleontological resources. The potential effects of renewable energy development would be analyzed at the time it is proposed. BLM would attempt to prevent or mitigate impacts to paleontological resources and especially “important” paleontological resources.

4.10.6.2 Reasonably Foreseeable Projects

Table 4.1 provides a list of current and reasonably foreseeable projects, including proposed renewable energy projects, various BLM-authorized actions, and other actions that may be considered. Most projects have either undergone independent environmental review pursuant to NEPA (and in some cases pursuant to the California Environmental Quality Act) or will do so prior to approval. The reasonably foreseeable projects that may affect paleontological resources are listed in Table 4.1.

4.10.6.3 Cumulative Impact Differences between Alternatives

Because paleontological resources are nonrenewable, the removal or destruction of any fossil resource results in a net loss of resources. Unavoidable adverse impacts on paleontological resources, however, are not anticipated to occur as a result of implementing the Proposed RAMP/CDCA Plan Amendment.

4.10.7 Mitigation Measures

Measures and BMPs related to paleontological resources outlined under all action alternatives in Chapter 2 (Section 2.3.11) would assist in minimizing potential impacts to paleontological resources. These measures, along with measures incorporated into

present and foreseeable actions, would avoid, minimize and mitigate potential impacts to paleontological resources.

4.11 Impacts on Visual Resources

This section provides a discussion of the methodology and criteria used to assess impacts to visual resources that could occur as a result of implementing the Proposed RAMP alternatives. The assessment of impacts related to specific future projects would utilize the Visual Contrast Rating component of the BLM's VRM System.

The BLM's responsibility to manage the scenic resources of public lands is established by both FLPMA and NEPA. The overall goal of the BLM's VRM system is to minimize visual impacts and to apply mitigation measures to potentially adverse visual impacts. The Visual Contrast Rating System is a formal process utilized by BLM to identify and analyze the potential visual impacts of projects and management-related activities. The basic analysis in this rating system focuses on the degree to which a project impacts the visual quality of an area. This depends on the visual contrast created between a given surface-disturbing activity and the existing landscape. Visual contrast is measured by comparing the features of the project or activity with the major features in the existing landscape. The basic design elements of form, line, color, and texture are used to make this comparison and describe the resulting visual contrast.

The analysis of potential impacts to visual resources was based on review of existing literature and the expertise of BLM resource specialists. Literature sources include but are not limited to the following:

- BLM Manual Section 8400—Visual Resource Management. It is BLM's policy that it has a basic stewardship responsibility to identify and protect visual values on all BLM lands. The manual provides specific direction in inventorying, evaluating, and determining impacts to visual resources.
- Information Bulletin No. 98-135
- Instruction Memorandum No. 98-164.
- Instruction Memorandum No. 2000-096 (Use of Visual Resource Management Class I Designation in WSAs)

The VRM system provides a way to identify, evaluate, and determine the appropriate levels of management of scenic values. The RAMP alternatives would establish landscape management classes ranging from Class I to IV, and all proposed projects/activities would adhere to the VRM class objectives as described in Chapter 2, Section 2.2.12. Impacts from management actions and decisions would in effect be self-

mitigating, in that their final approval would be based on meeting the visual quality objectives of the VRM class in which they take place. Design guidelines to avoid, minimize, or reduce visual impacts are included in Appendix C.

Impacts to visual resources are generally described as being potential increases to the contrast between proposed management actions or projects and the existing scenic quality of the surrounding landscape. The assessment of impacts related to specific future projects would utilize the Visual Contrast Rating component of the BLM's VRM System. Visual resource impacts are measured in terms of the level of contrast in form, line, texture, and color in the landscape that result from a land-disturbing activity. The level of acceptable contrast or change to the characteristic landscape ranges from minimal to high, depending on the location.

Impacts are also quantified as the change, in acres, to the inventoried scenic quality. The inventory of scenic quality has been documented for the BLM-administered lands within the Planning Area and is described in Chapter 3. The inventory serves as the basis for the designation of Visual Resource Management Classes (VRM Classes) I – IV in the alternatives described in Chapter 2. VRM Classes take into account other resource uses on public lands within the Planning Area.

The Planning Area was divided into eight Scenic Quality Rating Units for the inventory, with each unit comprising similar landscape forms and features. A summary of the visual resource inventory of scenic quality is shown in Table 4-12.

TABLE 4-12
VISUAL RESOURCE INVENTORY SUMMARY: SCENIC QUALITY

Scenic Quality Rating Unit	Acres	Scenic Quality	Subtotal Acres	% of Surface Acreage
Large Dunes		A	121,657	57%
Small Dunes				
Microphyll Woodlands				
Dissected Creosote		B	80,981	38%
Creosote Flats				
High-use Areas		C	12,292	5%
Interstate 8 Corridor				
Agricultural Area				

4.11.1 Loss and Degradation of Visual Resources

Adverse impacts to visual resources from air quality (e.g., low visibility due to dust or smoke) would be temporary. Vegetation treatment activities (e.g., management of non-native and invasive species) could result in short-term adverse impacts to visual resources through the temporary loss of vegetative cover. Once desired vegetation

objectives are achieved, however, adverse impacts to visual resources would be minimized or eliminated. Vegetative treatments would generally be implemented to restore or enhance the natural conditions of the public lands, and would have beneficial impacts to visual resources independent of VRM designations. Restoration and/or enhancement of natural conditions would contribute to scenic quality by reducing visual contrast from pre-restoration conditions.

Wildlife enhancement activities (e.g., wildlife guzzlers) could result in an adverse alteration to the visual landscape unless designed to blend in with the surrounding landscape. Indirect beneficial effects would include wildlife viewing opportunities.

Protection of cultural resources and special designations (ACECs and the wilderness) could have indirect beneficial effects on visual resources to the extent that ground-disturbing activities would be minimized. The management activities allowed in ACECs would be protective in nature and, as such, would be beneficial to visual resources. The existing wilderness would continue to be managed under VRM class I objectives.

The viewsheds of important cultural resources would be maintained when the settings significantly contribute to the resources' scientific, public, traditional, or conservation values. This management approach to cultural resources within the Planning Area would also have concurrent beneficial impacts to visual resources. Avoiding surface impacts and maintaining viewsheds would contribute to visual quality and enhance visitor experience by retaining natural conditions and not increasing visual contrast levels.

Potential VRM classifications (see Section 2.3.12, Visual) vary by alternative and reflect management strategies that place a higher or lower priority on preserving or retaining the existing character and scenic quality of the landscape.

Mineral resource activities would be expected to have an adverse impact on visual resources within the viewshed of the activity (e.g., sand and gravel pit, geothermal facility).

Geothermal development can include multiple production and injection wells installed on pads that vary from 1 to 5 acres in size. Although they require less land for the plant itself, water-cooled geothermal systems need a continuous supply of water and create vapor plumes. Pipelines are constructed above ground, on supports, to transport geothermal fluids. Geothermal facilities can also include fencing, off-site access roads and transmission lines, ancillary buildings, water storage and discharge facilities, as well as drilling rigs or derricks and associated support facilities (Office of Indian Energy and Economic Development 2009a). Impacts to visual resources associated with geothermal development could include the degradation of sensitive viewsheds.

Facility development associated with recreation and visitor services (buildings, signs, structures, and associated infrastructure) could have an adverse impact on visual

resources, as could expansive, high-density RV camping. Unattended trash and windblown debris would detract from the scenic quality of the environment and result in adverse impacts on visual resources. Periodic diminishment of dark night skies resulting from night-time OHV recreation could adversely impact desired visitor visual experience of the night skies.

Recreationists would continue to congregate at the popular areas during peak-use times (i.e., major holiday weekends). Due to anticipated increases in visitation, the visual resources of the landscape during peak periods would appear more crowded at the popular areas when compared to baseline conditions. Increased visitation during peak-use periods would result in temporary (episodic) landscape changes. When the peak-use periods end, use levels and associated visual resources would return to a condition that would be similar to the baseline condition.

Visitor perception of scenic quality could be adversely impacted at times of high-volume vehicular use. Residual evidence of vehicular use, such as visible tracks in the sand dunes or on the routes, would have a temporary adverse impact on visitor perception of scenic quality.

Within designated closed OHV areas, no motorized travel is allowable. Visual resources would be maintained or enhanced within the proposed closed OHV management areas.

Utility-scale solar energy development can include commitment of a large land area for both PV and CSP systems. This land area would be used for the solar systems themselves (whether PV or CSP), ancillary buildings, water storage and discharge facilities, fencing, access roads, and offsite facilities such as a central power management facility with transmission and grid connections. The land disturbance would be greater for PV (9 acres per MW versus 5 acres per MW for CSP) due to the interconnectedness of the blocks of solar arrays and the lower efficiency rates. However, water use would be considerably greater for CSP, as PV uses minimal water (Office of Indian Energy and Economic Development 2009b). As with solar energy development, wind energy development can include commitment of a large land area. This land area would be used for the wind turbines themselves (which can range from 200 to 300 feet in height), ancillary facilities, fencing, access roads, and a central power management facility with transmission and grid connections (Office of Indian Energy and Economic Development 2009c). Impacts to visual resources associated with solar and wind energy development could include the degradation of sensitive viewsheds.

Lands and realty decisions that could have an adverse impact to visual resources include: ROW use and development; utility transmission infrastructure; renewable energy sites and associated structures; and communication facility sites and associated structures.

4.11.2 Differences between Alternatives

Under Alternatives 1, the VRM Classes would remain the same as in the 1987 RAMP. Under Alternatives 2 through 8, the RAMP would incorporate VRM classes within the Planning Area. VRM classes vary by alternative as shown on Table 2-7 (Chapter 2).

Differences in impacts to visual resources would vary by alternative. Table 2-8 depicts the number of acres that each alternative would designate to the four VRM classes.

Under alternatives 2 through 8, the North Anegodones Dunes Wilderness would be designated as VRM Class I. VRM classes would be the same under Alternatives 2, 4, 5, 6, and 8 (Table 2-8). Under Alternative 3, the highest number (173,794 acres) of VRM Class II acres and the lowest number (0 acre) of VRM Class IV acres are proposed.

Under Alternative 7, the lowest number (16,031 acres) of VRM Class II and highest number (84,094 acres) of VRM Class IV acres are proposed. Alternatives 1 and 7 reflect a management strategy that would place a lower priority on preserving or retaining the existing character and scenic quality of the landscape than under Alternative 3. Alternatives 2, 4, 5, 6, and 8 reflect a moderate level priority and preservation for visual resources (Table 2-8).

The following sections discuss visual impacts first by Visual Resource Management Classes and potential for resource use, and secondly by comparing the scenic quality of lands available for various uses under each alternative.

4.11.2.1 Potential Impacts to Visual Resources

Under all alternatives, BLM would be responsible for ensuring that management activities and future projects meet appropriate VRM objectives. Activities under alternatives that provide more acreage for OHV recreation, camping, construction activities, as well as geothermal leasing activities and renewable energy development could require higher levels of visual mitigation in order to meet underlying VRM objectives.

Impacts to visual resources from geothermal leasing would vary by alternative. Under all alternatives, wilderness would not be available for geothermal development. Under Alternatives 1, 2 and 7, 188,426 acres would be available for geothermal leasing, and potential adverse impacts to viewsheds would be greater (see Table 4-3). Under these alternatives, there would be increased potential for the loss of visual quality due to geothermal construction and development activities. Geothermal leasing would have the lowest potential for adverse impacts to visual resources under Alternative 3. Under this alternative, activities related to geothermal leasing would not be allowed within the Planning Area (see Table 4-3 and Map 2-8) resulting in beneficial effects to the visual quality. Potential adverse impacts within the Planning Area related to geothermal

facilities and development would also be low under Alternative 4. Under this alternative, 188,426 acres of the Planning Area would be available for geothermal leasing but with an NSO stipulation (Map 2-9). The NSO stipulation under this alternative would result in beneficial effects in that no disturbance to viewsheds within the Planning Area would likely occur. However, adverse impacts related to construction and development of geothermal facilities would occur outside the Planning Area, where the view from the Planning Area may be adversely impacted.

Under Alternatives 5 and 6, geothermal leasing would be limited to 11,939 acres within the Planning Area (see Table 4-3 and Map 2-10). Adverse impacts to visual resources would be concentrated in a relatively small portion of the Planning Area (6 percent). Under Alternative 8, there would be 35,115 acres available for geothermal leasing. Adverse impacts to visual resources would be similar to those for Alternatives 5 and 6, covering a relatively small portion of the Planning Area overall (16 percent).

Under all alternatives, the North Algodones Dunes Wilderness (26,098 acres) is closed to OHV recreation. OHV open areas designations would have the highest level of potential adverse impacts to visual resources under Alternative 1. Under this alternative, only wilderness acres within the Planning Area would be closed (26,098 acres or 12 percent of the Planning Area) to OHV recreation, increasing the potential for adverse impacts to visual quality and viewsheds from OHV recreation activities. Under Alternative 2, 35 percent of the Planning Area would be closed (75,322 acres) to OHV recreation, resulting in low to moderate adverse impacts to visual quality and viewsheds from OHV recreation activities.

Under Alternative 3, 41 percent of the Planning Area would be closed (87,778 acres) to OHV recreation, resulting in low adverse impacts to visual quality and viewsheds from OHV recreation activities. Alternatives 4, 5, and 6 may result in low potential adverse impacts to visual quality and viewsheds. Under these alternatives, 25 to 27 percent of the Planning Area would be closed to OHV recreation. Areas closed to OHV recreation would result in beneficial effects to visual resources through the elimination or reduction in presence of OHV recreation. Alternatives 7 and 8 would close 16 to 17 percent of the Planning Area, respectively, to OHV recreation, resulting in similar adverse impacts as those for Alternative 1 (see Table 4-3).

Under Alternatives 1, 2, and 7, lands available for solar and wind leasing would be the highest, resulting in greater potential adverse impacts to visual resources (see Table 4-3). Under these alternatives, 188,833 acres would be available for solar and wind development (see Table 4-3, Maps 2-29 and 2-33), resulting in potential adverse impacts to visual quality and viewsheds. Under Alternatives 1, 2, and 7, there would be no avoidance or exclusion acres for solar and wind energy development.

Under Alternative 3, a total of 47,131 acres would be available and 141,702 acres would be excluded from solar and wind lease and development (see Table 4-3 and Maps 2-30

and 2-34) resulting in lower potential adverse impacts to visual quality and viewsheds overall. Under this alternative there would be no avoidance acres for solar and wind energy development. Under this alternative, areas not available for solar and wind development would result in beneficial effects to visual resources through the reduction or elimination of surface-disturbing activities and presence of facilities.

Under Alternatives 4, 5, and 6, there would be 39,694 acres available, 144,290 acres designated as avoidance areas, and 4,847 acres excluded, resulting in moderate to high potential adverse impacts depending on avoidance area development. Avoidance areas would likely reduce the potential impacts related to surface-disturbing activities and the presence of developed areas on visual resources, resulting in a beneficial effect overall. However, visual resources may be adversely impacted under these alternatives if solar and wind energy proposals have no other reasonable location.

Under Alternative 8, a total of 27,606 and 35,115 acres, respectively, would be available, and 161,226 and 153,717 acres, respectively, would be excluded from solar and wind development. Under this alternative there would be no avoidance acres. Adverse impacts to visual resources from this alternative would be the lowest of the alternatives overall. An avoidance area is defined as an area to be avoided but may be available for location of right-of-ways with special stipulations. Visual resources may be adversely impacted under these alternatives, if solar and wind energy proposals have no other reasonable location.

4.11.2.2 Potential Impacts to Visual Inventory Classes

Generally, alternatives with a low correlation between the VRM classes and the Visual Resource Inventory (VRI) classes would result in greater adverse impacts to visual quality. Conversely, impacts would most likely be minimized by alternatives proposing visual management that either closely corresponds to the VRI classes, or proposes a more restrictive (higher) class designation. Table 4-13 below quantifies VRM class designation impacts to Visual Resource Inventory values by alternative.

As shown in Table 4-13, VRM class designations proposed by Alternatives 2, 4, 5, 6, and 8 have the highest correlation to the VRI classes. Each of these alternatives would designate 100 percent of VRI class I as VRM class I; 99 percent of VRI class II as VRM class II; 90 percent of VRI class III as VRM class III, and 99 percent of VRI class IV as VRM class IV. Therefore these alternatives would result in a very high level of retaining the integrity of the inventoried values, and consequently, the lowest levels of potential visual impact to those values and beneficial effects overall.

TABLE 4-13
COMPARISON OF VISUAL MANAGEMENT CLASSES WITH INVENTORY CLASSES BY ALTERNATIVE (ACRES)

VRM Management Class Designations (acres)		Visual Resource Inventory Class Designations (acres)								
		VRI Class I (acres)		VRI Class II (acres)		VRI Class III (acres)		VRI Class IV (acres)		Total (acres)
		26,098	%	98,640	%	76,466	%	13,727	%	214,930
Alternative 2										
VRM I	26,098	26,098	100	0	0	0	0	0	0	26,098
VRM II	104,739	0	0	97,920	99	6,624	9	195	1	104,739
VRM III	69,055	0	0	41	0	69,014	90	0	0	69,056
VRM IV	15,039	0	0	679	1	828	1	13,532	99	15,039
Total	214,930	26,098	100	98,640	100	76,466	100	13,727	100	214,930
Alternative 3										
VRM I	26,098	26,098	100	0	0	0	0	0	0	26,098
VRM II	173,794	0	0	97,961	99	75,638	99	195	1	173,794
VRM III	15,039	0	0	679	1	828	1	13,532	99	15,039
VRM IV	0	0	0	0	0	0	0	0	0	0
Total	214,930	26,098	100	98,640	100	76,466	100	13,727	100	214,930
Alternative 4										
VRM I	26,098	26,098	100	0	0	0	0	0	0	26,098
VRM II	104,739	0	0	97,920	99	6,624	9	195	1	104,739
VRM III	69,055	0	0	41	0	69,014	90	0	0	69,056
VRM IV	15,039	0	0	679	10	828	1	13,532	99	15,039
Total	214,930	26,098	100	98,640	100	76,466	100	13,727	100	214,930
Alternative 5										
VRM I	26,098	26,098	100	0	0	0	0	0	0	26098
VRM II	104,739	0	0	97,920	99	6,624	9	195	1	104,739
VRM III	69,055	0	0	41	0	69,014	90	0	0	69,056
VRM IV	15,039	0	0	679	1	828	1	13,532	99	15,039
Total	214,930	26,098	100	98,640	100	76,466	100	13,727	100%	214,930

TABLE 4-13
COMPARISON OF VISUAL MANAGEMENT CLASSES WITH INVENTORY CLASSES BY ALTERNATIVE (ACRES)

VRM Management Class Designations (acres)		Visual Resource Inventory Class Designations (acres)								
		VRI Class I (acres)		VRI Class II (acres)		VRI Class III (acres)		VRI Class IV (acres)		Total (acres)
		26,098	%	98,640	%	76,466	%	13,727	%	214,930
Alternative 6										
VRM I	26,098	26,098	100	0	0	0	0	0	0	26098
VRM II	104,739	0	0	97,920	99	6,624	9	195	1	104,739
VRM III	69,055	0	0	41	0	69,014	90	0	0	69,056
VRM IV	15,039	0	0	679	1	828	1	13,532	99	15,039
Total	214,930	26,098	100	98,640	100	76,466	100	13,727	100	214,930
Alternative 7										
VRM I	26,098	26,098	100	0	0	0	0	0	0	26,098
VRM II	16,031	0	0	9,248	9	6,588	9	195	1	16,031
VRM III	88,708	0	0	88,672	90	36	0	0	0	88,708
VRM IV	84,094	0	0	720	1	69,842	91	13,532	99	84,708
Total	214,930	26,098	100	98,640	100	76,466	100	13,727	100	214,930
Alternative 8										
VRM I	26,098	26,098	100	0	0	0	0	0	0	26098
VRM II	104,739	0	0	97,920	99	6,624	9	195	1	104,739
VRM III	69,055	0	0	41	0	69,014	90	0	0	69,056
VRM IV	15,039	0	0	679	1	828	1	13,532	99	15,039
Total	214,930	26,098	100	98,640	100	76,466	100	13,727	100	214,930

Note: Table shows what the difference is between inventoried values (Inventory Class) versus what each alternative proposes for management (Management Class). Each alternative will have the same amount of VRI Class I as VRM Class I. **Bold figures** indicate the degree to which VRM classes correlate with VRI classes. For example, in Alternative 7, 99 percent of the lands assigned VRI Class IV are proposed for management as VRM Class IV, whereas 0 percent of the VRI Class III lands is proposed for management as VRM Class III. Percentages are rounded to the closest whole number.

Alternative 3 also proposes a high correlation to VRI classes I and II (100 percent and 99 percent respectively). Additionally, this alternative would designate 99 percent of the VRI class III lands as VRM class II, and 99 percent of the VRI class IV lands as VRM class III, in effect raising the restrictiveness of standards and objectives by which these lands (approximately 89,000 acres) would be managed. Therefore this alternative would result in the highest level of retaining the integrity of the inventoried values, and consequently, the lowest level of potential visual impact of all alternatives, and the highest level of beneficial effects overall.

Alternative 7 proposes a high correlation to VRI classes I and IV (100 percent and 99 percent respectively). However, this alternative would designate 90 percent of the VRI class II lands as VRM class III, and 91 percent of the VRI class III lands as class IV, in effect lowering the restrictiveness of standards and objectives by which these lands (approximately 159,000 acres) would be managed. Therefore this alternative would result in the lowest level of retaining the integrity of the inventoried values and, consequently, the highest level of potential visual impact of all alternatives.

4.11.3 Irreversible and Irretrievable Commitment of Resources

Implementation of the Proposed RAMP/CDCA Plan Amendment could result in irreversible or irretrievable commitment of visual resources, particularly in areas where development (such as solar or geothermal) may occur.

4.11.4 Unavoidable Adverse Impacts

BLM law enforcement or emergency search and rescue activities could result in unavoidable adverse impacts to the scenic quality and visitor experience.

Development within the Planning Area (see Table 4-2) would result in long-term unavoidable impacts to visual resources. Mitigation measures to minimize these impacts would be required; however, permanent impacts to visual resources would occur. Project-level analyses would be required on a case-by-case basis for any proposed projects.

4.11.5 Short-term Use and/or Long-term Productivity

Implementation of the Proposed RAMP/CDCA Plan Amendment would result in surface-disturbing activities (e.g., mineral, energy, ROWs, and recreational activities) that could result in adverse impacts to visual resources. Short-term uses of areas developed for renewable energy may have a long-term impact on the viewshed. Mitigation measures to minimize potential impacts to visual resources would be required for development projects.

4.11.6 Cumulative Impacts

4.11.6.1 Geographic Extent

The geographic extent (assessment area) for cumulative impacts on visual resources management is the I-8 corridor, SR-78 corridor, and the Planning Area and vicinity. The existing conditions for visual resources within the Planning Area, which represent the aggregate effect of past and present actions impacting visual resources, are described in Chapter 3, Section 3.11.

When private or other lands have more lenient visual quality objectives than adjacent BLM-administered lands, these differing objectives would potentially result in cumulative impacts to visual resources and visitor experience on adjacent BLM-administered lands in the Planning Area.

Several utility corridors are located within or adjacent to the Planning Area; their associated structures could have an adverse cumulative effect on the visual landscape. Operational activities of the Mesquite Regional Landfill have the potential to significantly increase truck traffic volumes within the Planning Area, thereby adversely affecting the scenic quality, and would be considered a cumulative impact. The All-American Canal lining project, the Drop 2 Reservoir project, and the UPRR double track project contribute to cumulative impacts on the visual environment.

4.11.6.2 Reasonably Foreseeable Projects

Table 4.1 provides a list of current and reasonably foreseeable projects, including proposed renewable energy projects, various BLM-authorized actions, and other actions that may be considered. Most projects have either undergone independent environmental review pursuant to NEPA (and in some cases pursuant to the California Environmental Quality Act) or will do so prior to approval. The reasonably foreseeable projects that may affect visual resources are listed in Table 4.1.

4.10.6.3 Cumulative Impact Differences between Alternatives

Alternatives providing more acreage for OHV recreation, camping, construction activities, as well as geothermal leasing activities and renewable energy development would result in greater adverse impacts to visual quality. Alternatives providing more acreage for resource protection such as areas closed to OHV recreation; closed or with NSO for surface-disturbing activities related to geothermal, solar, and wind energy; would result in greater beneficial effects on visual quality of the Planning Area.

Under all alternatives, the wilderness would not be available for geothermal development. Under Alternatives 1, 2 and 7, 188,426 acres would be available for

geothermal leasing and potential adverse impacts to viewsheds would be greater. Under these alternatives, there would be increased potential for the loss of visual quality due to geothermal construction and development activities (see Table 4-3). Geothermal leasing would have the lowest potential adverse impacts to visual resources under Alternative 3. Under this alternative, activities related to geothermal leasing would not be allowed within the Planning Area (see Table 4-3 and Map 2-8), resulting in beneficial effects to the visual quality. Potential adverse impacts within the Planning Area related to geothermal facilities and development would also be low under Alternative 4. Under this alternative, 188,426 acres of the Planning Area would be available for geothermal leasing but with an NSO stipulation (Map 2-9). The NSO stipulation under this alternative would result in beneficial effects in that no disturbance to viewsheds within the Planning Area would likely occur. However, adverse impacts related to construction and development of geothermal facilities would occur outside the Planning Area, where the view from the Planning Area may be adversely impacted.

Under Alternatives 5 and 6, geothermal leasing would be limited to 11,939 acres within the Planning Area (see Table 4-3 and Map 2-10). Adverse impacts to visual resources would be concentrated in a relatively small portion of the Planning Area (6 percent). Under Alternatives 7 and 8, there would be 16,031 and 3,190 acres available for geothermal leasing. Adverse impacts to visual resources would be similar to those for Alternatives 5 and 6, covering a relatively small portion of the Planning Area overall (1–7 percent).

Geothermal leasing has the potential to contribute to cumulative impacts to visual resources. However, there are currently no geothermal lease applications within the Planning Area and there are no reasonably foreseeable leases, therefore, no cumulative impacts to visual resources from these actions can be anticipated.

Under all alternatives, the North Algodones Dunes Wilderness (26,098 acres) is closed to OHV recreation. OHV open areas designations would have the highest level of potential adverse impacts to visual resources under Alternative 1. Under this alternative, no acres within the Planning Area would be closed (0 acre) to OHV recreation, increasing the potential for adverse impacts to visual quality and viewsheds from OHV recreation activities. Under this alternative, only wilderness acres within the Planning Area would be closed (26,098 acres or 12 percent of the Planning Area) to OHV recreation, resulting in low to moderate adverse impacts to visual quality and viewsheds from OHV recreation activities.

Under Alternative 3, 41 percent of the Planning Area would be closed (87,778 acres) to OHV recreation, resulting in low adverse impacts to visual quality and viewsheds from OHV recreation activities. Alternatives 4, 5, and 6 may result in low potential adverse impacts to visual quality and viewsheds. Under these alternatives, 25 to 27 percent of the Planning Area would be closed to OHV recreation. Areas closed to OHV recreation would result in beneficial effects to visual resources through the elimination or reduction

in disturbance presence of OHV recreation. Alternatives 7 and 8 would close 16 to 17 percent of the Planning Area, respectively, to OHV recreation, resulting in similar adverse impacts as those resulting from Alternative 1 (see Table 4-3).

Under Alternatives 1, 2 and 7, lands available for solar and wind leasing would be the highest, resulting in greater potential adverse impacts to visual resources (see Table 4-3). Under these alternatives, 188,833 acres would be available for solar and wind development (see Table 4-3, Maps 2-29 and 2-33), resulting in potential adverse impacts to visual quality and viewsheds. Under Alternatives 1, 2 and 7, there would be no avoidance or exclusion acres for solar and wind energy development.

Under Alternative 3, a total of 47,131 acres would be available and 141,702 acres would be excluded from solar and wind lease and development (see Table 4-3 and Maps 2-30 and 2-34) resulting in lower potential adverse impacts to visual quality and viewsheds overall. Under this alternative there would be no avoidance acres for solar and wind energy development. Under this alternative, areas not available for solar and wind development would result in beneficial effects to visual resources through the reduction or elimination of surface-disturbing activities and presence of facilities.

Under Alternatives 4, 5, and 6, there would be 39,694 acres available, 144,290 acres designated as avoidance areas, and 4,847 acres excluded, respectively, resulting in moderate to high potential adverse impacts depending on avoidance area development. Avoidance areas would likely reduce the potential impacts related to surface-disturbing activities and the presence of developed areas on visual resources, resulting in a beneficial effect overall. However, visual resources may be adversely impacted under these alternatives if solar and wind energy proposals have no other reasonable location.

Under Alternative 8, a total of 27,606 and 35,115 acres, respectively, would be available, and 161,226 and 153,717 acres, respectively, would be excluded from solar and wind development. Under this alternative there would be no avoidance acres. Adverse impacts to visual resources from this alternative would be the lowest of the alternatives overall. An avoidance area is defined as an area to be avoided but may be available for location of right-of-ways with special stipulations. Visual resources may be adversely impacted under Alternative 8, if solar and wind energy proposals have no other reasonable location.

4.11.7 Mitigation Measures

Measures and BMPs for visual resources outlined under all action alternatives in Chapter 2 (Section 2.3.12) would assist in minimizing potential impacts to visual resources.

4.12 Impacts on Special Designations and Lands with Wilderness Characteristics

Special designations within the Planning Area include wilderness and ACECs. In addition to special designations, this section assesses impacts to lands inventoried for wilderness characteristics, also identified as WCUs. Impacts on wilderness and lands with wilderness characteristics are those actions that reduce or enhance the wilderness characteristics of naturalness and opportunities for solitude or primitive forms of recreation. Impacts on ACECs are those actions that reduce the relevance and importance values of natural and cultural resources. These characteristics and values could be impacted by the use of motor vehicles and installation of structures causing surface disturbance and evidence of the human-caused modifications of the area.

Dust and erosion control measures could promote the natural desert experience within the wilderness, lands with wilderness characteristics, and ACECs. Wilderness, lands with wilderness characteristics, and ACEC values could be impacted by vegetation treatments (e.g., chemical and mechanical) for non-native invasive plant species removal. Restoration of previously disturbed areas could improve wildlife habitat and reduce instances of illegal incursion within the ACECs and wilderness.

Construction and maintenance of wildlife guzzlers could promote wildlife habitat, but construction of permanent human-made facilities would degrade wilderness values. Any closures resulting from special status species management could enhance the protection for the wilderness and ACEC values.

Cultural and natural resource interpretation could increase public awareness of sensitive resource values within the ACECs. Visual resource management could increase scenic quality values of the wilderness and ACECs. Special designation management actions would protect ACEC relevance and importance values.

Geothermal development can include multiple production and injection wells installed on pads that vary from 1 to 5 acres in size. Although they require less land for the plant itself, water-cooled geothermal systems need a continuous supply of water and create vapor plumes. Pipelines are constructed above ground, on supports, to transport geothermal fluids. Geothermal facilities can also include fencing, off-site access roads and transmission lines, ancillary buildings, water storage and discharge facilities, as well as drilling rigs or derricks and associated support facilities (Office of Indian Energy and Economic Development 2009a). Geothermal development could adversely impact ACECs by reducing the characteristics of relevance and importance, and potentially disturb natural and cultural resources.

Sensitive cultural and ecological resources would be protected by an NSO stipulation for leaseable and renewable energy authorizations. ROW construction and use (including

utility infrastructure and communication sites) and any other land uses could impact ACEC relevance and importance values. Adverse impacts would be minimized through BLM-required mitigation measures and BMP. Acquisition of holdings would protect ACEC relevance and importance values by adding acquired lands under protective management of the special designation area.

Potential adverse impacts from recreational activities (e.g., OHV recreation) would include disturbance of sensitive cultural or biological resources. Potential adverse impacts could occur from OHV recreation along routes of travel within ACECs. Impacts could include disturbance, erosion, loss of vegetation, potential wildlife mortality resulting from vehicle encounters, and increased visitation to sensitive resource areas (including cultural and wildlife). Interpretive materials and programs related to wilderness values and ACEC relevance and importance values could have a beneficial impact on land use ethics employed by visitors during their stay. Transportation and public access reductions, depending upon alternative, could increase trespass within the wilderness and ACECs.

Utility-scale solar energy development can include commitment of a large land area for both PV and CSP systems. This land area would be used for the solar systems themselves (whether PV or CSP), ancillary buildings, water storage and discharge facilities, fencing, access roads, and offsite facilities such as a central power management facility with transmission and grid connections. The land disturbance would be greater for PV (9 acres per MW versus 5 acres per MW for CSP) due to the interconnectedness of the blocks of solar arrays and the lower efficiency rates. However, water use would be considerably greater for CSP, as PV uses minimal water (Office of Indian Energy and Economic Development 2009b). As with solar energy development, wind energy development can include commitment of a large land area. This land area would be used for the wind turbines themselves (which can range from 200 to 300 feet in height), ancillary facilities, fencing, access roads, and a central power management facility with transmission and grid connections (Office of Indian Energy and Economic Development 2009c). Solar and wind development could adversely impact ACECs by reducing the characteristics of relevance and importance, and result in disturbance to natural and cultural resources.

4.12.1 Differences between Alternatives

Under Alternatives 1 and 2, the CDCA Plan would not be amended. Under Alternative 3, the CDCA Plan would be amended to incorporate management of lands with wilderness characteristics (42,083 acres) within the Planning Area. Under Alternatives 4 through 8, no lands with wilderness characteristics would be allocated within the Planning Area and no CDCA Plan Amendment would be needed.

Under Alternatives 3 through 8, the CDCA Plan would be amended to change the boundaries of the East Mesa ACEC and eliminate the North Algodones Dunes ACEC. Under these alternatives, the East Mesa ACEC would be reduced from 6,454 acres to 5,802 acres in order to eliminate overlap with the ISD SRMA east of the New Coachella Canal. The canal results in a barrier to travel of flat-tailed horned lizards and the area provides only marginal habitat for this species.

Under Alternatives 3 and 8, the CDCA Plan would be amended to exclude solar and wind energy development within ACEC's. Under Alternatives 4, 5, and 6, the CDCA Plan would be amended to classify ACEC's as avoidance areas for solar and wind energy development and classify ACEC's as avoidance areas for all land use authorizations other than solar and wind development.

Differences in impacts to special designations would potentially vary by alternative. Alternatives providing more acreage for OHV recreation, camping, construction activities, as well as renewable energy and geothermal leasing activities would result in greater adverse impacts (Table 4-14). Alternatives providing more acreage for resource protection, such as areas closed to OHV recreation, closed or with NSO for surface-disturbing activities related to geothermal, solar, and wind energy, would result in greater beneficial effects on special designation areas.

Under all alternatives, the North Algodones Dunes Wilderness (or North Algodones Dunes ACEC under Alternative 1) would be closed to geothermal development. Under Alternatives 1, 2, and 7, the East Mesa ACEC (6,454 acres under Alternatives 1 and 2; 5,802 acres under Alternative 7) and 416 acres of the Plank Road ACEC would be available to geothermal development, potentially resulting in adverse impacts to the natural and cultural values of these areas. Under Alternative 7, 42,083 acres of WCU 1 would be available for geothermal leasing. Under Alternatives 2, 3, and 8, WCU 1 acres would not be available for geothermal leasing. Under Alternatives 3, 5, and 6, land within the ACECs would not be available for geothermal development. Areas not available for geothermal leasing and development would result in beneficial effects to special designation areas from resource protection.

Under Alternatives 4 and 8, land within the East Mesa ACEC (5,802 acres) would be available for geothermal leasing with an NSO stipulation. Under Alternative 4, the Plank Road ACEC would be available for geothermal development with an NSO stipulation. Under alternatives 4, 5, and 6, WCU 1 would also be available for geothermal development with an NSO stipulation. Under Alternative 8 the Plank Road ACEC would not be available, and no adverse impacts to natural and cultural resource values would likely occur under this alternative (see Table 4-14). NSO stipulation and areas closed to development would result in beneficial effects in the sense that no disturbance to lands within special designations would occur.

**TABLE 4-14
POTENTIAL IMPACTS TO SPECIAL DESIGNATIONS BY ALTERNATIVE (ACRES)**

Designation	Alternative							
	1	2	3	4	5	6	7	8
Mineral Resources—Land Available for Geothermal Leasing (acres)								
East Mesa ACEC	6,454	6,454	0	0	0	0	5,802	0
Plank Road ACEC	298	298	0	0	0	0	298	0
North Algodones Dunes ACEC	854	854	n/a	n/a	n/a	n/a	n/a	n/a
North Algodones Dunes Wilderness	n/a	0	0	0	0	0	0	0
WCU 1	n/a	0	0	0	0	0	42,083	0
Mineral Resources—Land Not Available for Geothermal Leasing (acres)								
East Mesa ACEC	0	0	5,802	0	5,802	5,802	0	0
Plank Road ACEC	0	0	416	0	416	416	0	416
North Algodones Dunes ACEC	24,851	n/a	n/a	n/a	n/a	n/a	n/a	n/a
North Algodones Dunes Wilderness	n/a	26,098	26,098	26,098	26,098	26,098	26,098	26,098
WCU 1	n/a	42,083	42,083	0	0	0	0	42,083
Mineral Resources—Land Available but with NSO for Geothermal Leasing (acres)								
East Mesa ACEC	0	0	0	5,802	0	0	0	5,802
Plank Road ACEC	0	0	0	416	0	0	0	0
North Algodones Dunes ACEC	0	0	n/a	n/a	n/a	n/a	n/a	n/a
North Algodones Dunes Wilderness	n/a	0	0	0	0	0	0	0
WCU 1	n/a	0	0	42,083	42,083	42,083	0	0
Recreation—OHV Open (acres)								
East Mesa ACEC	67	652	0	0	0	0	0	0
Plank Road ACEC	416	416	416	416	416	416	416	416
North Algodones Dunes ACEC	468	418	n/a	n/a	n/a	n/a	n/a	n/a
North Algodones Dunes Wilderness	n/a	0	0	0	0	0	0	0
WCU 1	n/a	0	0	21,212	21,212	14,195	31,461	25,473

TABLE 4-14
POTENTIAL IMPACTS TO SPECIAL DESIGNATIONS BY ALTERNATIVE (ACRES)

Designation	Alternative							
	1	2	3	4	5	6	7	8
Recreation—OHV Closed (acres)								
East Mesa ACEC	0	0	0	0	0	0	0	0
Plank Road ACEC	0	0	0	0	0	0	0	0
North Algodones Dunes ACEC	24,851	318	n/a	n/a	n/a	n/a	n/a	n/a
North Algodones Dunes Wilderness	n/a	26,098	26,098	26,098	26,098	26,098	26,098	26,098
WCU 1	n/a	42,083	42,083	20,871	20,871	27,888	10,622	5,663
Recreation—OHV Limited (acres)								
East Mesa ACEC	6,454	6,454	5,802	5,802	5,802	5,802	5,802	5,802
Plank Road ACEC	0	0	0	0	0	0	0	0
North Algodones Dunes ACEC	385	116	n/a	n/a	n/a	n/a	n/a	n/a
North Algodones Dunes Wilderness	n/a	0	0	0	0	0	0	0
WCU 1	n/a	0	0	0	0	0	0	10,947
Lands and Realty—Renewable Energy (Solar and Wind) Available (acres)								
East Mesa ACEC	6,454	6,454	0	0	0	0	5,802	0
Plank Road ACEC	416	416	0	0	0	0	416	0
North Algodones Dunes ACEC	852	852	n/a	n/a	n/a	n/a	n/a	n/a
North Algodones Dunes Wilderness	n/a	0	0	0	0	0	0	0
WCU 1	n/a	0	0	0	0	0	42,083	0
Lands and Realty—Renewable Energy (Solar and Wind) Avoidance (acres)								
East Mesa ACEC	0	0	0	5,802	5,802	5,802	0	0
Plank Road ACEC	0	0	0	416	416	416	0	0
North Algodones Dunes ACEC	0	0	n/a	n/a	n/a	n/a	n/a	n/a
North Algodones Dunes Wilderness	0	0	0	0	0	0	0	0
WCU 1	n/a	42,083	42,083	0	0	0	0	42,083

**TABLE 4-14
POTENTIAL IMPACTS TO SPECIAL DESIGNATIONS BY ALTERNATIVE (ACRES)**

Designation	Alternative							
	1	2	3	4	5	6	7	8
Lands and Realty—Renewable Energy (Solar and Wind) Excluded (acres)								
East Mesa ACEC	0	0	5,802	0	0	0	0	5,802
Plank Road ACEC	0	0	416	0	0	0	0	416
North Algodones Dunes ACEC	24,851	318	n/a	n/a	n/a	n/a	n/a	n/a
North Algodones Dunes Wilderness	n/a	26,098	26,098	26,098	26,098	26,098	26,098	26,098
WCU 1	n/a	0	0	42,083	42,083	42,083	0	0

N/a = Not applicable. Applies to the North Algodones Dunes Wilderness ACEC as it overlaps with the North Algodones Dunes Wilderness. BLM strives to manage the area to the highest protection possible and to avoid management regime overlap.

Under all alternatives, the North Algodones Dunes Wilderness (the North Algodones Dunes ACEC under Alternative 1) would be closed to OHV and other motorized/mechanized recreation. Under all alternatives, OHV recreation within the East Mesa ACEC would be limited to designated routes (6,454 acres under Alternatives 1 and 2, 5,802 acres under all other alternatives), resulting in reduced potential adverse impacts to natural and cultural resources. Under all alternatives, 416 acres of the Plank Road ACEC would be open to OHV recreation, potentially resulting in disturbance to sensitive natural and cultural resources within the majority of this ACEC (see Table 4-14).

Under Alternatives 2 and 3, 42,083 acres would be closed to OHV recreation in WCU 1. These alternatives would have the highest acres closed to OHV recreation, and the most beneficial impacts to the wilderness characteristics and values of WCU 1. Under Alternatives 4 and 5, 21,212 acres would be open and 20,871 acres would be closed to OHV recreation in WCU 1. Under Alternative 6, 14,195 acres would be open and 27,888 acres would be closed to OHV recreation in WCU 1. Under Alternative 7, 31,461 acres would be open and 10,622 would be closed to OHV recreation in WCU 1. Under Alternative 8, 25,473 acres would be open, 5,663 acres would be closed, and 10,947 would be limited to OHV recreation in the WCU 1 designation. This alternative would have the lowest acres of closed OHV recreation and the highest acres designated as limited OHV recreation use.

For solar and wind energy, under Alternatives 1, 2, and 7, the East Mesa ACEC (6,454 acres under Alternatives 1 and 2; 5,802 acres under Alternative 7) and 416 acres of the Plank Road ACEC would be available to development. Under Alternatives 3 and 8, no solar or wind energy development would be allowed within the East Mesa or Plank Road ACECs, resulting in beneficial effects to resources within these special designations.

Under Alternatives 4, 5, and 6, the East Mesa ACEC and Plank Road ACEC would be avoidance areas for solar and wind energy. Avoidance areas would likely reduce the potential impacts related to surface-disturbing activities and the presence of developed areas on special designation, resulting in a beneficial effect overall. However, under these alternatives, potential adverse impacts to sensitive natural and cultural resources with ACECs may occur if no other reasonable areas for development are found. Under all alternatives, solar and wind development would not be allowed within the North Algodones Dunes Wilderness (North Algodones Dunes ACEC under Alternative 1).

Under Alternative 7, 42,083 of the WCU 1 would be available for solar and wind energy development. Under Alternatives 2, 3, and 8, 42,083 acres of the WCU 1 would be avoidance areas for solar and wind energy development. Under Alternatives 4, 5, and 6, 42,083 acres of the WCU 1 would be excluded from solar and wind energy development.

4.12.2 Irreversible and Irretrievable Commitment of Resources

Implementation of the Proposed RAMP/CDCA Plan Amendment would not likely result in irreversible and irretrievable commitment of resources related to special designations.

4.12.3 Unavoidable Adverse Impacts

Unavoidable adverse impacts on wilderness values of naturalness and solitude include noise related to BLM law enforcement and emergency service activities that occur on SR-78 and roads adjacent to the wilderness.

4.12.4 Short-term Use and/or Long-term Productivity

There would be no short-term uses of special designation areas that would likely result in impact to long-term productivity within the Planning Area.

4.12.5 Cumulative Impacts

4.12.5.1 Geographic Extent

The geographic extent for cumulative impacts to special designations and lands with wilderness characteristics is the Planning Area. The existing condition for special designations and lands with wilderness characteristics in the Planning Area, which represents the aggregate effect of past and present actions impacting these areas, is described in Chapter 3, Section 3.12.

In portions of the region, where communities are sustaining substantial growth, requests for land use authorizations would be anticipated to increase and could be in conflict with wilderness values, lands with wilderness characteristics, and ACEC relevance and importance values, resulting in cumulative impacts.

4.12.5.2 Reasonably Foreseeable Projects

Table 4.1 provides a list of current and reasonably foreseeable projects, including proposed renewable energy projects, various BLM-authorized actions, and other actions that may be considered. Most projects have either undergone independent environmental review pursuant to NEPA (and in some cases pursuant to the California Environmental Quality Act) or will do so prior to approval. The reasonably foreseeable projects that may affect special designation areas are listed in Table 4.1.

4.12.5.3 Cumulative Impact Differences between Alternatives

Under all alternatives, the North Algodones Dunes Wilderness (the North Algodones Dunes ACEC under Alternative 1) would be closed to geothermal leasing, OHV and other motorized/mechanized recreation, and solar and wind (renewable energy) development.

Under Alternatives 1, 2, and 7, the East Mesa ACEC and 416 acres of the Plank Road ACEC would be available to geothermal development, potentially resulting in adverse impacts to the natural and cultural values of these areas. Under Alternatives 3, 5, and 6, land within the ACECs would not be available for geothermal development. Under Alternatives 4 and 8, land within the East Mesa ACEC (5,802 acres) would be available for geothermal leasing with an NSO stipulation. Under Alternative 4, the Plank Road ACEC would be available for geothermal development with an NSO stipulation. Under Alternative 8 the Plank Road ACEC would not be available for geothermal leasing. Geothermal leasing has the potential to contribute to cumulative impacts to special designations. However, there are currently no geothermal lease applications within the Planning Area and there are no reasonably foreseeable leases, therefore, no cumulative impacts to special designations from these actions can be anticipated.

Under all alternatives, OHV recreation within the East Mesa ACEC would be limited to designated routes. Under all alternatives, 416 acres of the Plank Road ACEC would be open to OHV recreation, potentially resulting in disturbance to sensitive natural and cultural resources within the majority of this ACEC (see Table 4-14). Recreational activities would be reasonably foreseeable to continue within the 416 acres of the Plank Road ACEC, resulting in cumulative impacts under all alternatives.

For solar and wind energy, under Alternatives 1, 2, and 7, the East Mesa ACEC (6,454 acres under Alternatives 1 and 2; 5,802 acres under Alternative 7) and 416 acres of the Plank Road ACEC would be available to development. Under Alternatives 3 and 8, no solar or wind energy development would be allowed within the East Mesa or Plank Road ACECs. Under Alternatives 4, 5, and 6, the East Mesa ACEC and Plank Road ACEC would be avoidance areas for solar and wind energy. Avoidance areas would likely reduce the potential impacts related to surface-disturbing activities and the presence of developed areas on special designation. Under all alternatives, there are currently no renewable energy lease applications within or adjacent to the East Mesa or Plank Road ACECs, and there are no reasonably foreseeable leases, therefore, no cumulative impacts to special designations from these actions can be anticipated.

Impacts from law enforcement or emergency search and rescue activities, including USBP activities, would continue to result in disturbance that would result in cumulative impacts to special designation areas. These impacts would be similar under all alternatives.

4.12.6 Mitigation Measures

Management actions and BMPs under all alternatives in Chapter 2, Section 2.3.13 would avoid or minimize potential impacts to special designations within the Planning Area.

4.13 Impacts on Mineral Resources

Impacts to mineral resources would be considered adverse when the alternative would affect the existing or potential future economic production of a mineral resource, either by limiting access to the resource or by degrading the quality of the resource. It would also be an adverse effect when implementation of the alternative would eliminate access to a potential mineral resource that has been determined by a regulating agency to be rare, unique, or regionally significant. Mineral resources would be adversely impacted when planning decisions limit access to or place limitations on the development of valuable mineral deposits.

Social and economic impacts to Mineral Resources are discussed in Section 4.18 of this chapter.

4.13.1 Impacts on Locatable (Metallic and Non-metallic/Industrial) Minerals

The North Algodones Dunes Wilderness is withdrawn from the operation of the mining and mineral leasing laws under all alternatives. There are no valid rights attendant to mineral resources on public lands that have not been appropriated prior to the wilderness designation. Adverse impacts to mineral resources would be expected from land use decisions identified in Table 2.11 where access to or availability of mineral resources would be impeded, denied, or restricted, including increased costs associated with restoration of surface disturbance in these areas.

The proposed withdrawal from mineral entry would prohibit access to and development of metallic and non-metallic/industrial minerals for new mineral locations on public lands, and increase costs associated with mitigation and design of access to private mineral interests in these areas. Where mining claims with verified valid existing rights are located in areas withdrawn from mineral entry, and these rights would need to be acquired to protect non-mineral resources, local or regional economies would be adversely impacted by restricting these metallic and non-metallic/industrial mineral deposits from foreseeable future use.

4.13.2 Impacts on Leasable (Energy) Resources

In the event that an application is proposed for development of leasable resources on BLM-administered lands within the Planning Area, impacts to leasable resource activities would vary by alternative as presented in Table 2.13 and management actions presented in section 2.3.14.5 (Mineral Resources).

4.13.3 Impacts on Salable (Construction) Materials

There is limited potential for future development of salable resources from BLM-administered lands within the Planning Area. In the event that an application is proposed for development of salable resources on BLM-administered lands within the Planning Area, impacts to salable resource activities would vary by alternative and by management actions presented in section 2.3.14.6 (Mineral Resources).

4.13.4 Differences between Alternatives

Under Alternatives 1 and 2, the CDCA Plan would not be amended. For locatable minerals, under Alternative 3 the CDCA Plan would be amended to: propose withdrawal of the ACEC's and critical habitat from mineral entry; and, propose withdrawal of the ISD SRMA from mineral entry. Under Alternatives 4, 5, and 6, the CDCA Plan would be amended to propose withdrawal of the ACEC's and critical habitat from mineral entry. Under Alternatives 7 and 8, locatable mineral management actions would remain consistent with the CDCA Plan and no amendment would be necessary.

For leasable minerals, under Alternative 3, the CDCA Plan would be amended to: prohibit geothermal minerals leasing within the entire Planning Area; prohibit surface occupancy within critical habitat, ACEC's, other special designations, and camping and staging areas; and, prohibit surface occupancy within the ISD SRMA. Under Alternative 4, the CDCA Plan would be amended to: open the entire Planning Area, with the exclusion of wilderness, to geothermal minerals leasing, but with a no surface occupancy stipulation; and, prohibit surface occupancy within critical habitat, ACEC's, other special designations, and camping and staging areas. Under Alternatives 5 and 6, the CDCA Plan would be amended to: allow geothermal mineral leasing on nominated lands under 43 CFR 32.03.10; and, prohibit surface occupancy within critical habitat, ACEC's, other special designations, and camping and staging areas. Under Alternative 7, leasable mineral management actions would remain consistent with the CDCA Plan and no amendment would be necessary. Under Alternative 8, the CDCA Plan would be amended to: classify the flat-tailed horned lizard management area as available for geothermal leasing, but with a no surface occupancy stipulation; classify the Limited Use Area (excluding flat-tailed horned lizard management area) as available for geothermal minerals leasing; exclude donated lands from geothermal minerals leasing; exclude ISD

SRMA from geothermal minerals leasing; and, prohibit surface occupancy within critical habitat, ACEC's, other special designations, and camping and staging areas.

For saleable minerals, under Alternatives 4 through 7 saleable mineral management actions would remain consistent with the CDCA Plan and no amendment would be necessary. Under Alternatives 3 and 8, the CDCA Plan would be amended to prohibit mineral sales or free use permits within the ISD SRMA.

Differences in impacts to mineral resources would potentially vary by alternative. The primary differences are related to lands available for geothermal leasing (leasable mineral resource; Table 4-3 and Maps 2-7 through 2-11). Under Alternatives 1, 2, and 7, 188,426 acres of the Planning Area would be available and 26,098 acres (the wilderness) would not be available for geothermal leasing, these alternatives would result in the highest potential mineral resource availability. Under Alternative 3, geothermal leasing would not be allowed (no available acres) within the Planning Area. Alternative 3 would result in the lowest potential mineral resource availability. Under Alternative 4, 188,426 acres would be available for geothermal leasing but with an NSO stipulation, thereby reducing surface-disturbing activities within the Planning Area. Under Alternatives 5 and 6, 11,939 acres would be available for geothermal leasing and the remainder of the Planning Area, 202,991 acres, would be unavailable. Under Alternative 8, a total of 35,115 acres would be available and 14,025 acres would be available with an NSO stipulation. The remainder of the Planning Area, 136,691 acres, would be unavailable (see Table 4-3).

Under Alternatives 1 and 2, the ISD SRMA would be maintained (excluding the wilderness) as open to mineral entry. Under Alternative 3, the ISD SRMA, ACECs, and critical habitat would be proposed for withdrawal from mineral entry. Under Alternatives 4, 5, and 6, ACECs and PMV critical habitat are proposed for withdrawal from mineral entry and the ISD SRMA would be maintained (excluding the wilderness) as open to mineral entry. Under Alternatives 7 and 8, the ISD SRMA (excluding the wilderness) and ACECs would be maintained as open to mineral entry.

4.13.5 Irreversible and Irretrievable Commitment of Resources

Implementation of the Proposed RAMP/CDCA Plan Amendment would not likely result in irreversible and irretrievable commitment of mineral resources within the Planning Area.

4.13.6 Unavoidable Adverse Impacts

There would be no unavoidable adverse impacts to mineral resources resulting from implementing the Proposed RAMP/CDCA Plan Amendment.

4.13.7 Short-term Use and/or Long-term Productivity

Implementation of the Proposed RAMP/CDCA Plan Amendment would not likely result in the short-term use of mineral resources that impacts long-term productivity.

4.13.8 Cumulative Impacts

4.13.8.1 Geographic Extent

The geographic extent for cumulative impacts to mineral resources is the Planning Area. The existing condition for mineral resources in the Planning Area, which represents the aggregate effect of past and present actions impacting mineral resources, is described in Chapter 3, Section 3.13.

4.13.8.2 Reasonably Foreseeable Projects

Table 4.1 provides a list of current and reasonably foreseeable projects, including proposed renewable energy projects, various BLM-authorized actions, and other actions that may be considered. Most projects have either undergone independent environmental review pursuant to NEPA (and in some cases pursuant to the California Environmental Quality Act) or will do so prior to approval. The reasonably foreseeable projects that may affect mineral resources are listed in Table 4.1.

4.13.8.3 Cumulative Impact Differences between Alternatives

Currently, there is low potential for most mineral resources, excluding sand, gravel, and geothermal resources, within the Planning Area. There are currently no applications for mineral resources within the Planning Area and no reasonably foreseeable applications or development; therefore, no cumulative impacts are anticipated.

4.13.9 Mitigation Measures

No mitigation measures for mineral resources would be required for implementation of the Proposed RAMP/CDCA Plan Amendment.

4.14 Impacts on Recreation Program

The recreational resources and activities within the Planning Area could be impacted by management actions pertaining to the following: air resources, soil resources, vegetative resources, wildlife resources, special status species, cultural resources, visual resources, special designations, mineral resources, transportation and public access, lands and realty, and public health and safety. Adverse impacts on recreation primarily

occur from management actions related to other resources or resource uses that result in long-term elimination or reduction of recreation opportunities or degradation of the recreation setting and experience (e.g., limited access, development activities, and presence of human-made facilities).

Use of dust suppression or means of dust control could benefit the visitor experience. Any dust-control measures that prohibit or restrict vehicular access and recreational activities would reduce those opportunities available in the Planning Area. Any air or soil management actions that could result in recreational restrictions would also reduce the recreational opportunities available in the Planning Area.

Implementing management actions to improve vegetation communities and wildlife habitat could enhance the recreation setting and experience for recreationists seeking natural landscapes. To the extent that those actions restrict motorized recreation, OHV recreational opportunities and visitor experience could be diminished. Restrictions on dead and downed wood collection could have an adverse impact on visitor experience.

Management of special status species could affect recreation through habitat improvements and land-use restrictions. Controlling surface-disturbing and disruptive activities to minimize adverse impacts on critical habitat, applying BMP to avoid or reduce habitat fragmentation, and prohibiting surface-disturbing activities within occupied and suitable habitat would all help to improve ecosystem conditions and the aesthetic values of these areas. Such actions could indirectly enhance the recreation experience for those seeking natural landscapes by improving the setting in which non-motorized recreational activities take place. Such actions, however, could also constrain the development of recreation facilities, as well as diminish OHV recreational experience and opportunity.

Protecting and interpreting cultural and historic resources could enhance the recreational setting and experience for visitors seeking interpretation and knowledge of the cultural resources within the Planning Area. To the extent that these actions would result in closure or reduction of access to areas otherwise available for recreation (e.g., Plank Road ACEC), such actions would diminish OHV recreational experience and opportunity.

Managing visual resources in accordance with individual VRM class objectives would protect, enhance, or diminish the aesthetic values of the recreational setting.

Within the Plank Road ACEC, currently exposed portions of the Plank Road remnants are closed to access and use. Should additional remnants of the Plank Road be uncovered, these areas could be restricted to access and recreational use. In addition, while there could be educational opportunities, there could also be a loss of OHV recreational opportunity.

Geothermal development can include multiple production and injection wells installed on pads that vary from 1 to 5 acres in size. Although they require less land for the plant itself, water-cooled geothermal systems need a continuous supply of water and create vapor plumes. Pipelines are constructed above ground, on supports, to transport geothermal fluids. Geothermal facilities can also include fencing, off-site access roads and transmission lines, ancillary buildings, water storage and discharge facilities, as well as drilling rigs or derricks and associated support facilities (Office of Indian Energy and Economic Development 2009a). Areas open to mineral development could allow surface disturbance that could adversely impact the desirability of these areas for recreational use and restrict access. Geothermal development could have an adverse impact on recreational opportunities by reducing public access and altering the aesthetics of the natural landscape. Opportunities for motorized and non-motorized recreationists seeking natural landscapes could also be adversely impacted. Areas available for geothermal leasing but with an NSO stipulation would likely not eliminate recreational opportunities. Areas designated as avoidance are areas to be avoided but may be available for location of right-of-ways with special stipulations. Recreational opportunities would be considered prior to allowing development in avoidance areas.

Increased traffic volume within the Planning Area would have an adverse impact on visitor experience. Acquisition of access routes that are currently held by non-BLM entities could have a beneficial impact on visitor experience by assuring continued accessibility of recreational resources.

Utility-scale solar energy development can include commitment of a large land area for both PV and CSP systems. This land area would be used for the solar systems themselves (whether PV or CSP), ancillary buildings, water storage and discharge facilities, fencing, access roads, and offsite facilities such as a central power management facility with transmission and grid connections. The land disturbance would be greater for PV (9 acres per MW versus 5 acres per MW for CSP) due to the interconnectedness of the blocks of solar arrays and the lower efficiency rates. Water use would be considerably greater for CSP, however, as PV uses minimal water (Office of Indian Energy and Economic Development 2009b). As with solar energy development, wind energy development can include commitment of a large land area. This land area would be used for the wind turbines themselves (which can range from 200 to 300 feet in height), ancillary facilities, fencing, access roads, and a central power management facility with transmission and grid connections (Office of Indian Energy and Economic Development 2009c). Issuing ROWs, leases, and temporary use permits could reduce recreational opportunity if public access were to be restricted (e.g., restricting public access for safety and security reasons near facility infrastructure). Acquisition of lands or easements could enhance recreational opportunity as it could enable more public access and increase the acreage of the Planning Area. Solar and wind energy development could have an adverse impact on recreational opportunities by reducing public access and altering the aesthetics of the natural landscape.

Emergency services, sanitation, law enforcement, and garbage collection may become more intensive management issues as visitation in specific areas increases. Increased public education regarding OHV safety, border issues, UXO, and the risks associated with the desert environment could improve public safety and enhance visitor experience.

4.14.1 Differences between Alternatives

Under Alternatives 1 and 2, the CDCA Plan would not be amended. For Alternatives 3 through 8, the CDCA Plan would be amended to allocate RMZ's within the Planning Area. RMZ's would differ by alternative and are presented in Table 2-14 (Chapter 2).

Motorized camping opportunities would be increased or decreased by alternative, depending on the location of closed OHV management areas and campground closures in the microphyll woodlands. The closure of certain OHV management areas would likely result in the displacement of visitors and adversely impact their experience. Potential campground closures would have a direct adverse impact on visitors in areas where overcrowding could occur due to displaced visitor migration within the Planning Area. Other displaced visitors could be more likely to seek alternative recreation opportunities outside the Planning Area. Under Alternatives 1, 2, 4, 5, 6, and 7, camping would continue to be allowed within the microphyll woodlands between SR 78 and I-8, and within the Dunebuggy Flats campground. Under Alternative 3, there would be the potential for campgrounds in the Dunebuggy Flats and Gecko areas to be closed. Under Alternative 8, campgrounds south of Wash 30 and north of Wash 70 would be closed to camping but open to OHV use. Camping within the Dunebuggy Flats campground would continue to be allowed under Alternative 8.

Facility development could have a beneficial or adverse impact depending on visitor expectation of the recreation experience. Additional facility development could be required, depending on the alternative selected, to accommodate increased visitation or displaced visitors within the Planning Area. Visitor services (e.g., public education, trash collection, emergency services) could increase or decrease depending on the alternative selected and associated revenues generated/lost. Commercial SRPs for vending could be approved or denied depending on opportunities available under the alternative selected (see Section 4.18 Impacts to Social and Economic Setting). Visitor experiences could be enhanced or diminished depending on the availability of vending activities.

An increase or decrease in travel routes and public access could enhance or diminish visitor experience, depending on the alternative.

Public health and safety could be more difficult to manage in areas where visitor use increases, depending on the alternative.

Analysis of impacts to the social and economic setting for recreation is found in Section 4.18 of this chapter.

4.14.2 Irreversible and Irretrievable Commitment of Resources

Implementation of the Proposed RAMP/CDCA Plan Amendment would not likely result in irreversible or irretrievable commitment of recreational resources.

4.14.3 Unavoidable Adverse Impacts

There would be no unavoidable adverse impacts to recreation or the recreational experience resulting from implementing the Proposed RAMP/CDCA Plan Amendment.

4.14.4 Short-term Use and/or Long-term Productivity

Implementation of the Proposed RAMP/CDCA Plan Amendment would not likely result in the short-term use of recreational resources that impacts long-term productivity.

4.14.5 Cumulative Impacts

4.14.5.1 Geographic Extent

The geographic extent for cumulative impacts to recreation is the Planning Area. The existing condition for recreation in the Planning Area, which represents the aggregate effect of past and present actions impacting recreation, is described in Chapter 3, Section 3.14.

Operational activities of the Mesquite Regional Landfill will increase truck traffic volumes within the Planning Area, thereby adversely affecting the recreational experience, and would be considered a cumulative impact. The UPRR double track project has the potential to increase train traffic adjacent to the Planning Area. Law enforcement or emergency search and rescue activities, including USBP activities, could result in cumulative impacts. The All-American Canal lining project has eliminated lands available for OHV recreational opportunities in the Planning Area. The Drop 2 Reservoir project has reduced access and OHV recreational opportunities. The development of OHV recreational services on adjacent private lands has enhanced recreational opportunities.

The potential privatization of the Planning Area through a concessions contract could result in cumulative impacts through increased development of infrastructure and support services (e.g., hotels, campgrounds, restaurants, controlled access).

4.14.5.2 Reasonably Foreseeable Projects

Table 4.1 provides a list of current and reasonably foreseeable projects, including proposed renewable energy projects, various BLM-authorized actions, and other actions

that may be considered. Most projects have either undergone independent environmental review pursuant to NEPA (and in some cases pursuant to the California Environmental Quality Act) or will do so prior to approval. The reasonably foreseeable projects that may affect recreation are listed in Table 4.1.

4.14.5.3 Cumulative Impact Differences between Alternatives

Under Alternatives 1, 2, 4, 5, 6, and 7, camping would continue to be allowed within the microphyll woodlands between SR 78 and I-8, and within the Dunebuggy Flats campground. No cumulative impacts related to recreational use would be expected under these alternatives.

Under Alternative 3, there would be the potential for campgrounds in the Dunebuggy Flats and Gecko areas to be closed.

Under Alternative 8, campgrounds south of Wash 30 and north of Wash 70 would be closed to camping but open to OHV use. Camping within the Dunebuggy Flats campground would continue to be allowed under Alternative 8. Cumulative impacts to recreational use of areas closed to camping would likely occur under Alternatives 3 and 8, with impacts likely greater under Alternative 3.

4.14.6 Mitigation Measures

Management actions and BMPs under all alternatives in Chapter 2, Section 2.3.15 would avoid or minimize potential impacts to recreation within the Planning Area.

4.15 Transportation and Public Access

Dust and erosion control measures, as well as additional route maintenance, could have a beneficial impact by making public routes safer for travel and access.

Depending on the alternative, the opening, limitation, or closure of recreation areas could have a beneficial or adverse impact on transportation and public access by altering visitor use patterns. Displacement of visitors due to recreation area closures could result in overuse of remaining access routes and could cause an adverse impact. Public access could be improved through opening additional acreage for recreational use.

Geothermal development can include multiple production and injection wells installed on pads that vary from 1 to 5 acres in size. Although they require less land for the plant itself, water-cooled geothermal systems need a continuous supply of water and create vapor plumes. Pipelines are constructed above ground, on supports, to transport geothermal fluids. Geothermal facilities can also include fencing, off-site access roads

and transmission lines, ancillary buildings, water storage and discharge facilities, as well as drilling rigs or derricks and associated support facilities (Office of Indian Energy and Economic Development 2009a).

Utility-scale solar energy development can include commitment of a large land area for both PV and CSP systems. This land area would be used for the solar systems themselves (whether PV or CSP), ancillary buildings, water storage and discharge facilities, fencing, access roads, and offsite facilities such as a central power management facility with transmission and grid connections. The land disturbance would be greater for PV (9 acres per MW versus 5 acres per MW for CSP) due to the interconnectedness of the blocks of solar arrays and the lower efficiency rates. However, water use would be considerably greater for CSP, as PV uses minimal water (Office of Indian Energy and Economic Development 2009b). As with solar energy development, wind energy development can include commitment of a large land area. This land area would be used for the wind turbines themselves (which can range from 200 to 300 feet in height), ancillary facilities, fencing, access roads, and a central power management facility with transmission and grid connections (Office of Indian Energy and Economic Development 2009c). Authorizations, ROWs, temporary use permits, leases (e.g., geothermal, wind, solar), or mining activity could result in temporary or permanent closure of public access, which could be an adverse impact. Geothermal, wind, and solar energy development could result in permanent closure of public access, which could be an adverse impact.

Acquisitions of holdings or easements could enhance public access within the Planning Area, resulting in a beneficial impact.

Concessions could generate increased traffic volumes, thereby resulting in an adverse impact on transportation and public access. Infrastructure to facilitate recreation area management (e.g., controllable entry points) could have a beneficial or adverse impact.

Social and economic impacts to Transportation and Access are discussed in Section 4.18.3 of this chapter.

4.15.1 Differences between Alternatives

Under Alternatives 1 and 2, the CDCA Plan would not be amended. Alternatives 3 through 8 would designate OHV management areas that would vary by alternative. Under Alternative 3, the CDCA Plan would be amended to designate 74,676 acres as open, 87,778 acres as closed, and 52,477 as limited to motorized use. Under Alternative 4, the CDCA Plan would be amended to designate 105,843 acres as open, 55,220 as closed, and 53,868 as limited to motorized use. Under Alternative 5, the CDCA Plan would be amended to designate 103,839 acres as open, 58,614 as closed, and 52,477 as limited to motorized use. Under Alternative 6, the CDCA Plan would be amended to

designate 108,914 acres as open, 53,539 as closed, and 52,477 as limited to motorized use. Under alternative 7, the CDCA Plan would be amended to designate 125,710 acres as open, 36,743 as closed, and 52,477 as limited to motorized use. Under Alternative 8, the CDCA Plan would be amended to designate 127,416 acres as open, 35,144 as closed, and 52,370 as limited to motorized use. Table 2-15 shows the differences between alternatives for OHV management area designations.

OHV management area designations by alternative, as depicted in Table 4.2 above, provide varying levels of opportunities for motorized recreation. Under Alternative 1 (1987 condition), 120,393 acres would be designated as open, 26,098 acres (wilderness) would be designated as closed, and 68,440 acres would be designated as limited OHV management areas. Under Alternative 2 (current condition), 87,713 acres would be designated as open, 75,322 acres (including the wilderness) would be designated as closed, and 51,896 acres would be designated as limited OHV management areas. Areas designated as closed to OHV recreation would eliminate motorized recreational opportunities, resulting in adverse impacts to recreation. Areas designated as open, as well as limited, would result in beneficial effects by allowing motorized use and maintaining or increasing OHV recreational opportunities.

Under Alternative 3, the least number of acres would be designated as open (74,676 acres), the greatest number of acres would be designated as closed (87,778 acres), and 52,478 acres would be designated as limited OHV management areas. This alternative would have the highest adverse impacts to motorized recreational opportunities.

Under Alternative 4, 105,843 acres would be designated as open, 55,220 acres (including the wilderness) would be designated as closed, and 53,868 acres would be designated as limited OHV management areas. Alternatives 5 and 6 would be similar to Alternative 4. Under Alternative 5, 103,839 acres would be designated as open, 58,614 acres (including the wilderness) would be designated as closed, and 52,477 acres would be designated as limited OHV management areas. Under Alternative 6, 108,914 acres would be designated as open, 53,539 acres (including the wilderness) would be designated as closed, and 52,478 acres would be designated as limited OHV management areas. Under Alternative 7, 125,710 acres would be designated as open, 36,743 acres would be designated as closed OHV management (including the wilderness), and 52,478 acres would be designated as limited OHV management areas.

Under Alternative 8, the greatest number of acres (127,416 acres) would be designated as open to OHV use, 35,144 acres would be designated as closed (including the wilderness), and 52,370 acres would be designated as limited. Alternative 8 would result in the highest beneficial effects to motorized recreational opportunities.

Differences in impacts to transportation and public access would vary by alternative, depending on development of lands for geothermal resources, OHV management area

closures, solar and wind energy development, and access adjacent to the US–Mexico border.

Geothermal leasing availability would have the greatest potential adverse impacts to transportation and access under Alternatives 1, 2, and 7. Under these alternatives, 188,426 acres would be available for geothermal leasing, potentially disrupting or eliminating existing roadways and routes within the Planning Area. Geothermal leasing would have the lowest potential adverse impacts to transportation and access under Alternative 3. Under this alternative, activities related to geothermal leasing would not be allowed within the Planning Area (Map 2-8). Potential adverse impacts within the Planning Area related to geothermal facilities and development would also be low under Alternative 4. Under this alternative, 188,426 acres of the Planning Area would be available for geothermal leasing but with an NSO stipulation (Map 2-9). Under Alternative 4, adverse impacts related to construction and development of geothermal facilities would occur outside the Planning Area, where transportation and access of the Planning Area may not be impacted. Under Alternatives 5 and 6, geothermal leasing would be limited to 11,939 acres within the Planning Area (see Table 4-3 and Map 2-10). Under Alternative 8, impacts to transportation and access would be marginally higher (35,115 acres versus 11,939 acres) than Alternatives 5 and 6. Potential adverse impacts to transportation and access would likely be concentrated in a relatively small portion of the Planning Area (5 to 16 percent) under these alternatives.

Depending on the location of closed OHV management areas, the closure of certain OHV management areas would likely result in the closure of access and travel routes. Under Alternatives 1, 2, 4, 5, 6, and 7, transportation and access would likely remain the same. Under Alternative 3, proposed closed OHV management areas within the ISD SRMA could potentially lead to the closure of the Dunebuggy Flats campground, depending on PMV rainfall thresholds. Under Alternative 3, the southern portions of Gecko Road campgrounds may be closed. Under Alternative 8, campgrounds south of Wash 30 and north of Wash 70 would be closed, but remain open to OHV recreation.

Under Alternatives 1, 2, and 7, lands available for solar and wind leasing would be the highest, resulting in greater potential adverse impacts to transportation and access. Under these alternatives, 188,833 acres would be available for solar and wind development, except the wilderness (see Table 4-3 and Maps 2-29 and 2-33), resulting in potential loss or reduction of travel routes and access. Under Alternatives 3 and 8, 47,131 and 27,606 acres, respectively, would be available for solar, and 47,131 and 35,115 acres, respectively, would be available for wind lease and development (see Table 4-3 and Maps 2-30, 2-32, 2-34 and 2-36), resulting in a lower potential for loss or reduction of travel routes and access. Under Alternatives 4, 5, and 6, there would be 144,290 acres of land designated as avoidance areas. Transportation and access may be adversely impacted under these alternatives if solar and wind energy proposals have

no other reasonable location. Under these alternatives, the wilderness would continue to be excluded.

4.15.2 Irreversible and Irretrievable Commitment of Resources

Implementation of the Proposed RAMP/CDCA Plan Amendment would not likely result in irreversible or irretrievable commitment of resources related to transportation and access within the Planning Area.

4.15.3 Unavoidable Adverse Impacts

Temporary closures (e.g., wash outs or accidents) would result in disruptions to public access. Route congestion could limit public access to the recreation area and would be considered an unavoidable adverse impact.

4.15.4 Short-term Use and/or Long-term Productivity

There would be no short-term uses related to transportation and access that would likely result in impact to long-term productivity within the Planning Area.

4.15.5 Cumulative Impacts

4.15.5.1 Geographic Extent

The geographic extent for cumulative impacts to transportation and public access is the Planning Area and major roadways in and adjacent to the Planning Area. The existing condition for transportation and public access in the Planning Area, which represents the aggregate effect of past and present actions impacting transportation and public access, is described in Chapter 3, Section 3.15.

Construction activities within the BOR-withdrawn area (e.g., canals) could cause temporary loss of access. Temporary construction or maintenance for USBP tactical infrastructure within or adjacent to the Planning Area could limit public access. California Department of Transportation road maintenance within or adjacent to the Planning Area could be considered a cumulative impact.

Operational activities of the Mesquite Regional Landfill will increase truck traffic volumes within the Planning Area, thereby adversely affecting transportation and public access, and would be considered a cumulative impact.

The establishment of a border safety zone would result in a cumulative impact to access in the area of the U.S.–Mexico border.

4.15.5.2 Reasonably Foreseeable Projects

Table 4.1 provides a list of current and reasonably foreseeable projects, including proposed renewable energy projects, various BLM-authorized actions, and other actions that may be considered. Most projects have either undergone independent environmental review pursuant to NEPA (and in some cases pursuant to the California Environmental Quality Act) or will do so prior to approval. The reasonably foreseeable projects that may affect transportation and access are listed in Table 4.1.

4.15.5.3 Cumulative Impact Differences between Alternatives

Geothermal leasing availability would have the greatest potential adverse impacts to transportation and access under Alternatives 1, 2, and 7. Under these alternatives, 188,426 acres would be available for geothermal leasing. Geothermal leasing would have the lowest potential adverse impacts to transportation and access under Alternative 3, as activities related to geothermal leasing would not be allowed within the Planning Area (Map 2-8). Potential adverse impacts within the Planning Area related to geothermal facilities and development would also be low under Alternative 4, as 188,426 acres of the Planning Area would be available for geothermal leasing under it but with an NSO stipulation (Map 2-9). Under Alternatives 5 and 6, geothermal leasing would be limited to 11,939 acres within the Planning Area (see Table 4-3 and Map 2-10). Under Alternative 8, impacts to transportation and access would be marginally higher (35,115 acres versus 11,939 acres) than under Alternatives 5 and 6. Geothermal leasing has the potential to contribute to cumulative impacts to transportation and access. However, there are currently no geothermal lease applications within the Planning Area and there are no reasonably foreseeable leases, therefore, no cumulative impacts to transportation and access from these actions can be anticipated.

Depending on the location of closed OHV management areas, the closure of certain OHV management areas would likely result in the closure of access and travel routes. Under Alternatives 1, 2, 4, 5, 6, and 7, transportation and access would likely remain the same; therefore, these alternatives would not contribute to potential cumulative impacts of geothermal leasing. Under Alternative 3, proposed closed OHV management areas within the ISD SRMA could potentially lead to the closure of the Dunebuggy Flats campground, depending on PMV rainfall thresholds. Under Alternative 3, the southern portions of Geko Road campgrounds may be closed. Under Alternative 8, campgrounds south of Wash 30 and north of Wash 70 would be closed but remain open to OHV recreation. Campground closures would result in minor to moderate cumulative impacts to transportation and access in the Planning Area.

Under Alternatives 1, 2, and 7, lands available for solar and wind leasing would be the highest, resulting in greater potential adverse impacts to transportation and access. Under these alternatives, 188,833 acres would be available for solar and wind

development. Under Alternatives 3 and 8, 47,131 and 27,606 acres, respectively, would be available for solar, and 47,131 and 35,115 acres, respectively, would be available for wind lease and development. Under Alternatives 4, 5, and 6, there would be 144,290 acres of land designated as avoidance areas.

4.15.6 Mitigation Measures

Management actions and BMPs under all alternatives in Chapter 2, Section 2.3.16 would avoid or minimize potential impacts to transportation and access within the Planning Area.

4.16 Impacts on Lands and Realty Program

Special status species and special designations management could preclude lands and realty actions from being authorized. Management of desired plant communities (e.g., microphyll woodlands) could have an adverse impact on lands and realty authorizations.

Geothermal, wind, and solar energy development could result in additional lands and realty ROWs and authorizations. Any land acquisitions could increase lands available for lands and realty authorizations. ROW issuance could be facilitated by current and future utility corridors within the Planning Area.

Land acquisitions of private land from willing sellers could be used to enhance recreational opportunities and natural and cultural resources. Acquisitions of private land benefits various federal programs and results in long-term enhancement from BLM administration.

Utility ROWs may enhance access to the public lands for recreational opportunities or possibly lead to loss of public access or viewsheds. Utility ROWs may provide infrastructure for the needs of the recreating public (e.g., power lines, water).

Social and economic impacts to lands and realty are discussed in Section 4.18 of this chapter.

4.16.1 Differences between Alternatives

Under Alternatives 1 and 2, the CDCA Plan would not be amended. Lands and realty management actions related to land available for solar and wind energy development would require a CDCA Plan Amendment. Under Alternative 3, 47,131 acres would be available and 141,702 acres would be excluded from solar and wind development within the Planning Area. Under Alternatives 4, 5, and 6, 39,694 acres would be available, 144,290 acres would be avoidance, and 4,847 acres would be excluded from solar and wind energy development. Under Alternative 7, 188,832 acres (the entire Planning Area

excluding wilderness) would be available for solar and wind development. Under Alternative 8, 27,606 and 35,115 acres, respectively, would be available solar and wind development, and 161,226 and 153,717, acres, respectively, would be excluded from solar and wind development. All other lands and realty actions would remain in compliance with the CDCA Plan.

Table 2-17 (Lands and Realty) provides a breakdown of the proposed actions for lands and realty by alternative. Differences in impacts to lands and realty would vary by alternative. The primary differences are related to lands available for solar and wind development.

Under Alternatives 1, 2, and 7, lands available for solar and wind leasing would be the highest. Under these alternatives, 188,833 acres would be available for solar and wind development (including PMV critical habitat, flat-tailed horned lizard management area, donated lands, and ACECs); all 26,098 acres of the North Algodones Dunes Wilderness would be excluded (see Table 4-3 and Maps 2-29 and 2-33). These alternatives would result in greatest beneficial effects to lands and realty actions; however, these alternatives would also result in the greatest adverse impacts to PMV critical habitat, flat-tailed horned lizard management area, donated lands, and ACECs due to potential solar and wind energy development.

Under Alternatives 3 and 8, 47,131 and 27,606 acres, respectively, within the Planning Area would be available for solar, and 47,131 and 35,115 acres, respectively, available for wind development; the wilderness as well as the remainder of the Planning Area would be excluded (including PMV critical habitat, flat-tailed horned lizard management area, donated lands, and ACECs; see Table 4-3 and Maps 2-30, 2-32, 2-34, and 2-36). Alternative 3 would result in the greatest potential impacts to lands and realty actions due to the reduction of lands available for solar and wind energy development; however, Alternative 3 would result in the greatest beneficial effects to PMV critical habitat, flat-tailed horned lizard management area, donated lands, and ACECs.

Under Alternatives 4, 5, and 6, there would be 144,290 acres of land designated as development avoidance areas (including PMV critical habitat, flat-tailed horned lizard management area, donated lands, and ACECs) and 39,694 acres would be available. Within the avoidance areas, development may occur if no other reasonable alternative is found. Avoidance areas may result in reduced lands and realty actions, resulting in potential adverse impacts.

For apiary permits, under Alternatives 1, 4, 5, 6, 7, and 8, apiary permits would continue to be allowed on a case-by-case basis within strategically located sites to limit interaction with the public. Under Alternative 3, apiary permits would be prohibited within the Planning Area. Under this alternative, apiary permittees would experience adverse impacts due to the inability to obtain an apiary permit within the Planning Area.

4.16.2 Irreversible and Irretrievable Commitment of Resources

Implementation of the Proposed RAMP/CDCA Plan Amendment would not likely result in irreversible or irretrievable commitment of lands and realty resources.

4.16.3 Unavoidable Adverse Impacts

There would be no unavoidable adverse impacts to the lands and realty program as a result of implementing the Proposed RAMP/CDCA Plan amendment.

4.16.4 Short-term Use and/or Long-term Productivity

Implementation of the Proposed RAMP/CDCA Plan Amendment would not likely result in the short-term uses of lands and realty that impacts long-term productivity.

4.16.5 Cumulative Impacts

4.16.5.1 Geographic Extent

The geographic extent for cumulative impacts to the lands and realty program is the Planning Area. The existing condition for the lands and realty program in the Planning Area, which represents the impacts from aggregate effects of past and present actions, is described in Chapter 3, Section 3.16.

In the California Desert District as a whole, there are numerous applications for a total of over 300,000 acres of public lands for renewable energy development. It is unknown at this time how many of these projects would be approved and constructed, but it is likely that the California Desert District would be an important resource for renewable energy generation. There is the potential that additional applications could be approved and could result in a cumulative increase in renewable energy development in the region.

In portions of the region, where communities are sustaining substantial growth, requests for land use authorizations would be anticipated to increase. If the magnitude of conflicts between wildlife habitat conservation and land-use authorizations increase, the availability of land-use authorizations could be diminished. When use authorizations are approved by the BLM in important wildlife habitat, they generally will be accompanied by requirements for habitat compensation/mitigation. As private lands are purchased to implement compensation requirements, the supply of private parcels in habitat areas would continue to decrease, making it more difficult to acquire lands in habitat areas.

4.16.5.2 Reasonably Foreseeable Projects

Table 4.1 provides a list of current and reasonably foreseeable projects, including proposed renewable energy projects, various BLM-authorized actions, and other actions that may be considered. Most projects have either undergone independent environmental review pursuant to NEPA (and in some cases pursuant to the California Environmental Quality Act) or will do so prior to approval. The reasonably foreseeable projects that may affect lands and realty are listed in Table 4.1.

4.16.5.3 Cumulative Impact Differences between Alternatives

Under Alternatives 1, 2, and 7, lands available for solar and wind leasing would be the highest, 188,833 acres. No cumulative impacts to renewable energy development under the lands and realty program are anticipated under these alternatives.

Under Alternatives 3 and 8, which propose 47,131 and 27,606 acres, respectively, within the Planning Area available for solar development, and 47,131 and 35,115, respectively, for wind development; the wilderness as well as the remainder of the Planning Area would be excluded. Under Alternatives 4, 5, and 6, there would be 144,290 acres of land designated as development avoidance areas and 39,694 acres would be available. Within the avoidance areas, development may occur if no other reasonable alternative is found. Alternatives 3, 4, 5, 6, and 8 would result in the reduction of lands available for solar and wind energy development, requiring applicants to seek alternate sites outside the Planning Area.

For apiary permits, under Alternatives 1, 4, 5, 6, 7, and 8, apiary permits would continue to be allowed on a case-by-case basis within strategically located sites to limit interaction with the public. No cumulative impacts to apiary permits under the lands and realty program are anticipated under these alternatives.

Under Alternative 3, apiary permits would be prohibited within the Planning Area. Under this alternative, apiary permittees would need to seek alternate sites outside the Planning Area.

Overall, cumulative impacts to the lands and realty program under all alternatives would be minimal.

4.16.6 Mitigation Measures

No mitigation measures for lands and realty would be required for implementation of the Proposed RAMP/CDCA Plan Amendment.

4.17 Impacts on Public Health and Safety

Impacts to public health and safety would be considered significant if the implementation of an alternative would cause or potentially result in greater safety risks. Beneficial impacts could also result from implementation of an alternative that would minimize or significantly reduce certain health and safety issues.

Dust and erosion control measures would have a beneficial impact on the health and safety of the public, BLM employees, and other agency personnel.

The opening, limitation, or closure of recreational areas could have a beneficial or adverse impact on public health and safety by altering visitor use patterns. Increased visitor density could increase the potential for disputes involving visitors and public safety personnel. Recreational management goals promote public health and safety through partnerships and collaboration, which could have a net beneficial effect to the visitor experience and natural and cultural resource protection.

Some of the services provided by BLM-permitted commercial vendors (e.g., personal protective equipment, vehicle repairs, and vehicle safety equipment) could enhance public safety. Concessions (i.e., privatization) could control access to the Planning Area, thereby increasing public health and safety; however, this could also substantially reduce law enforcement funding (via fees) to provide for public health and safety. The services provided at recreational and administrative facilities (e.g., education, emergency medical services, and law enforcement) could enhance the public health and safety of visitors.

Restricting major access routes to street-legal vehicles could provide more effective traffic management, which would be a beneficial effect. Conversely, such restrictions could not only increase OHV traffic and speeding through campsites but also increase dust levels.

Any type of barricade, fencing, signage, or other physical structure within the Planning Area could have an adverse impact on public safety due to potential vehicle collisions with the structure(s).

Geothermal development can include multiple production and injection wells installed on pads that vary from 1 to 5 acres in size. Although they require less land for the plant itself, water-cooled geothermal systems need a continuous supply of water and create vapor plumes. Pipelines are constructed above ground, on supports, to transport geothermal fluids. Geothermal facilities can also include fencing, off-site access roads and transmission lines, ancillary buildings, water storage and discharge facilities, as well as drilling rigs or derricks and associated support facilities (Office of Indian Energy and Economic Development 2009a).

Utility-scale solar energy development can include commitment of a large land area for both PV and CSP systems. This land area would be used for the solar systems themselves (whether PV or CSP), ancillary buildings, water storage and discharge facilities, fencing, access roads, and offsite facilities such as a central power management facility with transmission and grid connections. The land disturbance would be greater for PV (9 acres per MW versus 5 acres per MW for CSP) due to the interconnectedness of the blocks of solar arrays and the lower efficiency rates. However, water use would be considerably greater for CSP, as PV uses minimal water (Office of Indian Energy and Economic Development 2009b). As with solar energy development, wind energy development can include commitment of a large land area. This land area would be used for the wind turbines themselves (which can range from 200 to 300 feet in height), as well as ancillary facilities, fencing, access roads, and a central power management facility with transmission and grid connections (Office of Indian Energy and Economic Development 2009c). Impacts to soil resources from wind energy development could include both compaction and erosion. Infrastructure associated with geothermal, solar, wind, or electrical transmission and generation could have an adverse impact on public health and safety as it could increase the potential for vehicular and aircraft collisions with the associated facility.

Communication site towers (e.g., cell or radio) could have a beneficial effect on public health and safety by supporting emergency communications and services. Temporary use permits for activities such as construction or filming could cause temporary hazardous conditions. Apiary activities could have an adverse impact (e.g., bee stings) on recreational visitors, depending on the location and density of apiary sites.

There are no known existing hazardous materials sites (see Appendix P) on BLM-administered lands within the Planning Area. Any future encounters would be handled pursuant to BLM regulations. Reclamation of former mining sites and pits would reduce human safety hazards.

Because portions of the Planning Area were previously used for military training, UXO are likely to occur. Any encounters with UXO would be handled pursuant to BLM regulations and in coordination with local agencies. Coordination for removal and safe disposal of UXO with local agencies would promote public health and safety within the Planning Area.

The USBP is responsible for patrol and enforcement of the U.S.-Mexico border. The potential exists for cross-traffic encounters between the public and law enforcement agents during enforcement activities. The establishment of a border safety zone could have a beneficial effect on public health and safety.

4.17.1 Differences between Alternatives

Under Alternatives 1 and 2, the CDCA Plan would not be amended. Under Alternative 3, the CDCA Plan would be amended to prohibit public use of the area within 100 feet of the U.S.–Mexico border. Under Alternatives 4, 5, and 6, the CDCA Plan would be amended to prohibit public use of the Roosevelt Reservation area (60 feet) adjacent to the U.S.–Mexico border. Alternatives 7 and 8 would continue current management of this area and would not require a CDCA Plan Amendment.

Differences in impacts to public health and safety from geothermal development, OHV management, solar and wind energy development, and U.S.–Mexico border access would vary by alternative.

Geothermal leasing availability would have the greatest potential adverse impacts to public health and safety under Alternatives 1, 2, and 7. Under these alternatives, the highest number of acres would be available for geothermal development.

Geothermal leasing would have the lowest potential adverse impacts to public health and safety under Alternative 3. Under this alternative, activities related to geothermal leasing would not be allowed within the Planning Area (Map 2-8) thereby no potential public health and safety hazards related to geothermal development would occur. Potential adverse impacts within the Planning Area related to geothermal facilities and development would be low under Alternative 4. Under this alternative, 188,426 acres of the Planning Area would be available for geothermal leasing but with an NSO stipulation (Map 2-9). Under Alternative 4, adverse impacts related to construction and development of geothermal facilities would occur outside the Planning Area. Under Alternative 8, adverse impacts to public health and safety would be marginally higher (35,115 acres versus 11,939 acres) than Alternatives 5 and 6. Potential adverse impacts to public health and safety would likely be concentrated in a relatively small portion of the Planning Area (5 to 16 percent) under these alternatives.

Depending on the location of closed OHV management areas, changes in visitor use patterns and density of visitors could occur. Under Alternatives 1, 2, 4, 5, 6, 7, and 8 access and campground availability would likely remain the same. Under Alternative 3, proposed closed OHV management areas within the ISD SRMA could potentially lead to the closure of the Dunebuggy Flats campground, depending on PMV rainfall thresholds. The closure would likely lead to increased densities of visitors within remaining campgrounds, potentially increasing disputes between visitors and public safety personnel and resulting in adverse impacts to public health and safety.

Under Alternatives 1, 2, and 7, lands available for solar and wind leasing would be the highest. Under these alternatives, 188,833 acres would be available for solar and wind development; all 26,098 acres of the North Algodones Dunes Wilderness would be excluded (see Table 4-3 and Maps 2-29 and 2-33). Under these alternatives, there

would be an increased risk from collision with infrastructure related to development resulting in adverse impacts to public health and safety. Under Alternatives 3 and 8, which propose 47,131 and 27,606 acres, respectively, within the Planning Area available for solar development, and 47,131 and 35,115, respectively, for wind development; the wilderness as well as the remainder of the Planning Area would be excluded (see Table 4-3 and Maps 2-30, 2-32, 2-34 and 2-36). Under these alternatives, potential collisions and other public health and safety issues related to infrastructure would be minimized, also minimizing adverse impacts to public health and safety. Under Alternatives 4, 5, and 6, 144,290 acres of land would be designated as development avoidance areas and 39,694 acres would be available for development. Within the avoidance areas, development may occur if no other reasonable alternative is found. Public health and safety adverse impacts under these alternatives may be moderate, depending on the areas developed for solar and wind facilities.

Access and travel adjacent to the U.S.–Mexico border varies by alternative (Table 2-21). Under Alternatives 1, 2, 7, and 8 public access and travel adjacent to the U.S.–Mexico border would remain open. Under these alternatives, potential unsafe encounters with border enforcement activities and illegal activities related to the U.S.–Mexico border would continue, resulting in adverse impacts to public health and safety. Under Alternative 3, the area within 100 feet of the U.S.–Mexico border would be closed to public access and travel, potentially reducing adverse impacts of unsafe encounters with speeding law enforcement vehicles and other border related hazards. Under Alternatives 4, 5, and 6, a 60-foot area (called the Roosevelt Reservation) adjacent to the U.S.–Mexico border would be closed to public travel and access, also potentially reducing adverse impacts of unsafe encounters as mentioned for Alternative 3.

4.17.2 Irreversible and Irretrievable Commitment of Resources

Implementation of the Proposed RAMP/CDCA Plan Amendment would not likely result in irreversible and irretrievable commitment of resources related to public health and safety within the Planning Area.

4.17.3 Unavoidable Adverse Impacts

Increased visitor density could impact public health and safety during specific timeframes, potentially increasing conflicts between visitors, which would be an unavoidable adverse impact, and which would require law enforcement intervention.

4.17.4 Short-term Use and/or Long-term Productivity

Implementation of the Proposed RAMP/CDCA Plan Amendment would not likely result in the short-term use of resources that impacts long-term productivity related to public health and safety.

4.17.5 Cumulative Impacts

4.17.5.1 Geographic Extent

The geographic extent for cumulative impacts to public health and safety resources is the Planning Area. The existing condition for public health and safety in the Planning Area, which represents the aggregate effect of past and present actions impacting soil resources, is described in Chapter 3, Section 3.17. In general, management actions related to public health and safety within the Planning Area are not expected to affect adjacent lands; however, management actions that improve public health and safety within the Planning Area may also result in improvements on adjacent lands.

Additional UPRR fencing along Wash Road could have an adverse cumulative impact on public health and safety. The U.S.–Mexico border barrier would result in beneficial cumulative impacts to public health and safety by delineating the U.S.–Mexico border, restricting access, and reducing smuggling activity.

Regional population growth and the increasing popularity of OHV recreation could create more demand for recreational opportunities, which could result in an adverse cumulative impact on public health and safety within the Planning Area.

There are several activities within the Planning Area and general vicinity that could add to cumulative noise effects, including:

- Train noise associated with the UPRR double tracking project along the east side of the Planning Area
- Noise associated with recreational and support activities, especially both concentrated and dispersed OHV uses of the Planning Area and immediate vicinity
- Vehicular traffic noise on major roadways leading to the Planning Area
- Intermittent military aircraft maneuvers and military weapons explosions associated with the use of the Chocolate Mountain Aerial Gunnery Range located to the northwest of the Planning Area and a gunnery range north of East Mesa
- Occasional military aircraft overflights associated with flight corridors located above and adjacent to the Planning Area

- Military helicopter use of the Planning Area as a training ground for the use of night vision devices
- Mineral exploration, including drilling by Mesquite Mine and/or Glamis Imperial under existing BLM approvals
- Construction of utility lines
- Construction activities, pursuit activities and medical response activities conducted by USBP. These activities may include the use of a helicopter, heavy equipment, and law enforcement vehicles.

4.17.5.2 Reasonably Foreseeable Projects

Table 4.1 provides a list of current and reasonably foreseeable projects, including proposed renewable energy projects, various BLM-authorized actions, and other actions that may be considered. Most projects have either undergone independent environmental review pursuant to NEPA (and in some cases pursuant to the California Environmental Quality Act) or will do so prior to approval. The reasonably foreseeable projects that may affect public health and safety are listed in Table 4.1.

4.17.5.3 Cumulative Impact Differences between Alternatives

Overall, there would be minimal cumulative impacts related to public health and safety under all alternatives.

4.17.6 Mitigation Measures

All alternatives in Chapter 2 (Section 2.3.18) include measures to minimize and avoid public health and safety concerns within the Planning Area.

4.18 Social and Economic Impacts

Management activities and land use decisions made in implementing the ISD RAMP/CDCA Plan Amendment would likely have effects on local and regional social and economic conditions. The resource capabilities or uses that would have the greatest potential to affect the social and economic environment include: Mineral Resource Management, Recreation Management, Transportation and Public Access, and Lands and Realty Management. The analysis of impacts to social and economic conditions is focused on these resource uses, which are discussed in their respective subsections.

Impacts to social conditions were identified as those management and land use decisions that would potentially affect the social aspect of: social well-being; changes to

use and lifestyle; people's interaction with the landscape; community perceptions of quality of life; attitudes and beliefs regarding the local environment, its uses, and sense of place; potential demand on BLM-administered land and resources; and limiting or enhancing community growth. The types of management actions that could affect social well-being include: the types and quantities of recreational experiences available; perception of conflict concerning resource use; and an individual's sense of control over decisions relating to their experience.

Impacts to economic conditions were identified as those management and land use decisions that would potentially affect the economic aspects of : revenue, employment/unemployment, personal income, and county tax base.

The economic subsections discuss the net change in total economic activity (the environmental consequence) as associated with each of the RAMP alternatives for the Planning Area. The net changes in economic activity are measured relative to the economic baseline (existing condition) identified in Chapter 3, Section 3.18 Social and Economic Setting.

In general, the total amount of economic activity on BLM-administered lands in the Planning Area represents a small portion of the \$23.1 billion total output of the economy within the EIA. This is true for each of the BLM's program functions within the Planning Area (e.g., permits, ROWs, and recreation), although the recreation activity within the Planning Area is recognized as important for the EIA economy, even if it is not substantial and represents less than one percent of the total economic output of the EIA economy. It is not expected that any of the RAMP alternatives would result in any significant economic impacts. Furthermore, the cumulative economic impacts of the BLM-administered lands in the Planning Area represent a small portion of the EIA economy as a whole and none of the proposed alternatives would result in a significant cumulative economic effect.

Please note that there is the potential for large-scale geothermal, solar, and wind energy development on BLM-administered lands within the Planning Area. The timing, feasibility, size, and specific location of these potential developments are unknown. As part of the application process, an applicant for a renewable energy project would be required to develop a detailed POD. The POD would be used as a basis for the Proposed Action that would be analyzed by the BLM to make a decision on the renewable energy project.

4.18.1 Social and Economic Impacts on Mineral Resources

4.18.1.1 Social Impacts

Mineral resources support community needs both inside and outside of the Planning Area. Mineral aggregates support construction and associated infrastructure; energy-related minerals support power generation, transportation, and economic development; and chemicals from industrial minerals enhance our standard of living.

Leasable mineral resources consist primarily of oil, gas, coal, and geothermal. There are no commercial oil, gas, or coal extraction operations on BLM-administered lands in the Planning Area, and the potential for hydrocarbon resources is low to non-existent. There is potential for geothermal development within the Planning Area.

Salable mineral resources relate primarily to sand and gravel extraction. There is one sand and gravel extraction operation on BLM-administered lands within the Planning Area. This non-commercial sand and gravel extraction activity is operated under a free-use permit granted by BLM to the County of Imperial. This activity is not located within the boundaries of the I SD SRMA, but is located within the approximate one-mile planning zone. No additional sand and gravel areas are proposed under any alternatives.

Locatable mineral resources include such metals as gold, silver, copper, uranium, and lead; non-metallic minerals such as asbestos, gypsum, borax, and mica; and gemstones such as turquoise, tourmaline, and diamonds. There are no locatable resource extraction operations on BLM-administered lands within the Planning Area. The potential for future development of metallic and non-metallic/industrial minerals is considered low.

Despite the potential increase in demand for mineral resources in and around the Planning Area, no impact to or change in community lifestyle is anticipated. Potential adverse impacts may occur to the way people/visitors interact with the landscape, if mineral resource demand increases, particularly related to geothermal mineral leases. Visitors and recreationists may have an adverse reaction to the disturbed landscapes created by geothermal development and extraction activities. Social well-being may be impacted if recreationists feel there is a conflict between recreational opportunities or experiences and geothermal development.

Community perceptions regarding quality of life and social well-being may be adversely impacted by population and mineral resource demand increases. The perception may be that the quality of life (quality of recreational experience) would decrease or decline as demand for mineral resources increases and development activities occur within the Planning Area.

Both beneficial and adverse social impacts from mineral resource management would likely occur. Beneficial impacts would occur from the continued and expanded availability of leasable and salable mineral resources to the community. Adverse impacts would occur from the potential conflict between recreational activities and mineral resource development, primarily from lands available for geothermal development.

4.18.1.2 Economic Impacts

4.18.1.2.1 Locatables

No measurable commercial activity for mining exists. No Plans of Operations have been submitted to the BLM to mine within the Planning Area. The existing conditions for locatables on BLM lands within the Planning Area did not yield an economic output. Therefore, no economic baseline exists for locatable minerals, and no economic impacts are anticipated under any of the proposed alternatives.

4.18.1.2.2 Leasables

There are no oil, gas, or coal leases on BLM-administered lands within the Planning Area. The existing conditions for oil, gas, and coal resources on BLM lands within the Planning Area did not yield a financially viable output. Therefore, no economic baseline exists for oil, gas, or coal energy production and no economic impacts are anticipated under any of the proposed alternatives.

There are no geothermal leases on BLM-administered lands within the Planning Area. There is no current commercial production of geothermal energy on BLM-administered lands within the Planning Area. If and when a project is proposed to the BLM, the BLM and operator(s) would need to prepare a project-specific POD. Each POD would need to address the potential impacts—including economic and social impacts—of a proposed geothermal mineral lease and development.

4.18.2 Social and Economic Impacts on Recreation Program

4.18.2.1 Social Impacts

The primary use of the Planning Area is recreation. There are numerous recreational communities of interest who use the area: OHV enthusiasts, campers, hunters, day hikers, backpackers, wildlife enthusiasts, and motor tourists.

Local community members have expressed a concern that if OHV recreation within the Planning Area is restricted, more recreational users who are turned away may trespass into privately owned land. This conflict is becoming more apparent as OHV enthusiasts

from urban areas travel to ever more distant areas for recreation (California State Parks 2002).

OHV regulations and changes in designations specific to certain areas would likely have little impact on new visitors from outside the region. New visitors would continue to have a variety of OHV opportunities available, which would become their frame of reference for OHV activities during subsequent visits. Minimal impact to social conditions would likely occur from OHV management decisions or designations affecting new visitors.

Frequent users and local individuals and/or groups may have beneficial or adverse reactions if certain favorite areas are not as open to satisfy their specific OHV recreation and history in the Planning Area. Impacts to frequent users and/or groups may be significant individually, but would not likely have an overall significant impact on the social condition or social well-being of the Planning Area. A variety of opportunities offering different OHV experiences would continue to be available for both new and frequent visitors.

The designation of closed OHV management areas would result in the loss of motorized recreational opportunities, which would directly impact visitors' use of the Planning Area. The majority of closed OHV management areas (26,098 acres) for all alternatives consist of the congressionally designated wilderness. The Wilderness Act of 1964 mandates BLM to enforce the prohibition of motorized vehicles on these designated lands.

The demand for recreational opportunities on public lands in the Planning Area is expected to continue to increase, both as a result of the increasing population and the growing numbers of seasonal visitors (primarily in the fall and winter). Increasing demand for recreational opportunities creates pressure for BLM to provide additional recreation resources. Demands also increase for facilities (such as vault toilets), as well as interpretive and visitor service programs. Any land use decisions or activity made would have impacts on recreation and, therefore, on social conditions and social well-being in the Planning Area. Additional planning, management, staffing, and funding would likely be required to achieve the goals for recreation management in the Planning Area.

Large groups of public land visitors within the Planning Area participate in formal or informal OHV clubs and activities. These opportunities provide visitors with a sense of community and belonging with those who enjoy experiencing the public lands in the same manner and result in a beneficial social impact overall. The designation of specific areas for camping and day-use activities generally concentrates visitor use. This concentration of visitor use, along with installation of recreation facilities and signs, promotes a sense of community, a sense of well-being, and improved environmental stewardship of the public lands.

4.18.2.2 Social Impacts by Alternative

4.18.2.2.1 Alternative 1

Under Alternative 1, the effects to all user groups would be similar to the existing condition; however, under this alternative there were no administrative closures within the Planning Area (condition prior to 2003). This alternative would be the most responsive to the desires of individuals and groups who feel that public lands should remain open to motorized access at the levels that existed in 1987. This alternative would best address the concerns of motorized recreation user groups and may enhance their sense of social well-being.

Under Alternative 1, conflicts between motorized vehicle recreationists and other types of recreationists (such as hikers and those wishing to enjoy the wilderness area in solitude and quiet) would occur and, perhaps, increase in the future as the number of visitors on public lands, particularly motorized recreationists, increases. User groups engaged in hiking and other types of non-motorized recreation would likely be the most adversely affected, decreasing their sense of social well-being related to the Planning Area.

Environmental advocacy groups and many of the individuals associated with these groups would not likely support Alternative 1. The environmental advocacy groups would likely believe that the natural and cultural resources, particularly high sensitive and endangered resources, within the Planning Area would not be sufficiently protected and conserved. An increasing number of groups and individuals throughout the country believe that motorized recreation management should place more emphasis on protection of sensitive natural and cultural resources. Alternative 1 would not be consistent with these attitudes.

4.18.2.2.2 Alternative 2

Under Alternative 2, the effects to all user groups would be essentially the same as the existing condition. Current management conditions would continue. This alternative is most responsive to the desires of groups and individuals that would like conditions within the Planning Area to remain the same, with no changes in recreational opportunities and management.

Alternative 2 would not likely be supported by user groups that prefer motorized recreational opportunities. Under this alternative, administrative closures would continue to limit OHV recreation within large portions of the central dunes. OHV recreationist would likely continue to visit the Planning Area at current levels but their sense of well-being would likely decrease with the continuation of the administrative closures and limitation on OHV recreational opportunities.

Under Alternative 2, conflicts between motorized vehicle recreationists and other types of recreationists (such as hikers and those wishing to enjoy the wilderness area in solitude and quiet) would continue to occur and, perhaps, increase in the future as the number of visitors on public lands, particularly motorized recreationists, increases. User groups engaged in hiking and other types of non-motorized recreation would continue to be affected at current levels and their sense of well-being would not likely change significantly.

Environmental advocacy groups and many of the individuals associated with these groups may support Alternative 2. The environmental advocacy groups may believe that the natural and cultural resources, particularly highly sensitive and endangered resources, found within the currently closed areas (administrative closures) of the Planning Area would be sufficiently protected and conserved. An increasing number of groups and individuals throughout the country believe that motorized recreation management should place more emphasis on protection of sensitive natural and cultural resources. Alternative 2 would be consistent with these attitudes.

4.18.2.2.3 Alternative 3

Alternative 3 would be the most responsive to the environmental advocacy groups and be the most responsive to the groups and individuals who would prefer the decrease in OHV visitors to the Planning Area. The environmental advocacy groups would support the increase in natural and cultural resource protection and conservation under the alternative. Alternative 3 would increase the sense of well-being for these groups.

Alternative 3 would not likely be supported by user groups that prefer motorized recreational opportunities. Under this alternative, the greatest number of acres would be closed to OHV recreational use. The limitations on OHV recreational use would not be supported by OHV users and would result in a decreased sense of well-being for these visitors. OHV recreationists would not be able to use the Planning Area in the same numbers and ways as in the past and would believe that their recreational opportunities were unfairly taken away.

4.18.2.2.4 Alternatives 4, 5, and 6

Under Alternatives 4, 5, and 6, open OHV management area acres would be less than Alternative 1 but greater than Alternative 3. These alternatives attempt to be responsive to both the environmental advocacy groups and the motorized vehicle recreationists.

The environmental advocacy groups may support portions of these alternatives that relate to natural and cultural resource protection and conservation; however, concerns related to increased OHV recreation as compared to Alternative 2 would likely continue. Alternatives 4, 5, and 6 may not change the sense of well-being for these groups.

Alternatives 4, 5, and 6 may be supported by user groups that prefer motorized recreational opportunities. Under these alternatives, more acres would be open to OHV recreational opportunities than under the existing condition (Alternative 2). These alternatives would address the concerns of motorized recreation user groups related to increased OHV recreation areas. Their sense of social well-being may be enhanced under these alternatives.

4.18.2.2.5 Alternative 7

Alternative 7 would be the most responsive to OHV recreational users and other motorized vehicle recreationists. This alternative is the most responsive to the desires of groups and individuals that would prefer that visitor numbers within the Planning Area remain the same or increase and who are less concerned about natural and cultural resource protection. The sense of well-being for these user groups would likely increase under Alternative 7 as compared to Alternative 2 (existing condition).

Under Alternative 7, conflicts between motorized vehicle recreationists and other types of recreationists (such as hikers and those wishing to enjoy the wilderness area in solitude and quiet) would likely increase as the number of visitors on public lands, particularly motorized recreationists, increases. User groups engaged in hiking and other types of non-motorized recreation would likely be the most adversely affected, decreasing their sense of social well-being related to the Planning Area.

The environmental advocacy groups would not likely support Alternative 7. These groups would likely believe that the natural and cultural resources, particularly highly sensitive and endangered resources, within the Planning Area would not be sufficiently protected and conserved. An increasing number of groups and individuals throughout the country believe that motorized recreation management should place more emphasis on protection of sensitive natural and cultural resources. Alternative 7 would not be consistent with these attitudes.

4.18.2.2.6 Alternative 8

Alternative 8 was developed to address OHV recreationist and environmental advocacy groups desired management of the Planning Area. Although neither of these groups would be fully satisfied with the management under Alternative 8, many concerns of each group would be addressed.

The OHV recreational users would likely have an increased sense of well-being under Alternative 8 from the increased number of acres open to OHV use as compared to Alternative 2. Under this alternative, visitation to the Planning Area may increase, but likely the increases would be similar to recent trends (approximately 3 percent per year, depending on economic conditions).

Under Alternative 8, environmental advocacy groups may experience a sense of well-being as the resources that these groups value most, such as federally designated critical habitat, would be conserved. Alternative 8 would likely not fully satisfy these user groups because motorized recreation would continue and a greater number of acres would be open to OHV use as compared to Alternative 2 and 3. This alternative is most responsive to the desires of groups and individuals that would prefer a balanced management approach for the Planning Area.

4.18.2.3 Economic Impacts

4.18.2.3.1 Economic Methodology for Alternatives

In Chapter 3, the analysis of recreational activities within the Planning Area and the associated economic impacts established a baseline (existing condition) for the number of visitors, visitor groups, and visitor days. As shown in Section 3.15.7, the visitation levels for the Planning Area peaked in FY2006 and have declined each subsequent year due to the weak economy and the decline in disposable income. Annual visitation levels are expected to fall a little further before experiencing some recovery and a return to growth trends in 2014 or 2015. Based on these trends, the baseline forecast visitation for the planning period was set at 1.25 million annual visits and 350,000 annual primary towing vehicles. Note that different methodologies were used in determining annual visitation for socioeconomics and air analysis. Please refer to the air resources analysis in Section 4.2 and Appendix D for details.

To develop estimates of tow vehicles and visitor groups for each of the proposed management alternatives, the change in the amount of riding acreage from the existing condition was used as the primary adjustment parameter as described below. The acreage of psammophytic scrub vegetation community (active and partially stabilized dunes) was used to determine riding acreage. Psammophytic scrub community (dunes) acres open to OHV recreation by alternative are provided in Table 4-15.

TABLE 4-15
SUMMARY OF PSAMMOPHYTIC SCRUB (RIDING ACREAGE) WITHIN OPEN OHV
RECREATION BY ALTERNATIVE

	Alternative							
	1	2	3	4	5	6	7	8
Psammophytic Scrub	84,592	51,727	41,076	70,891	67,501	70,020	77,439	79,038

Alternative 1 depicts the conditions that would have occurred currently had the Administrative Closures not occurred in 2001. The riding area under Alternative 1 is 84,592 acres. If riding areas are proportionally used to expand current activities with OHV closures to estimated activities without closures, 579,180 towing vehicle visits

would be expected compared to 350,000 under Alternative 2. However, based on growth rates indicated in the California State Parks publication, *Taking the High Road*, current unconstrained demand would only result in 531,714 towing vehicle visits (2002). Thus, under Alternative 1, 47,466 (i.e., 579,180 versus 531,714) more vehicles could be accommodated in the future (Table 4-16).

TABLE 4-16
SUMMARY OF VEHICLE ESTIMATES BY ALTERNATIVE

	Alternative							
	1	2	3	4	5	6	7	8
Towing Vehicles	531,714	350,000	232,073	479,669	456,731	473,776	523,974	531,714

Alternative 2 is the current condition with existing Administrative Closures as discussed in Chapter 3. The riding area under this alternative is 51,727 acres. Based on the estimate provided in "A Profile of the 2006 Visitor to the Imperial Sand Dunes Recreational Area," the current conditions render approximately 350,000 towing vehicle visits annually (i.e., 1.25 million visitors divided by 3.5 visitors per vehicle).

Alternative 3 would decrease the riding areas within the Planning Area to 41,076 acres from 51,727 acres under Alternative 2. Alternative 3 would result in the closure of campgrounds along the southern end of Gecko Road and Dunebuggy Flats campground. This represents roughly one-third of the user activity within the Planning Area. It is assumed that half of the displaced one-third of Planning Area visitors would relocate to other campgrounds within the Planning Area. The other half of the displaced Planning Area visitors are assumed to leave for alternative OHV areas such as Ocotillo Wells State Vehicle Recreation Area (i.e., visitation would be permanently displaced to alternative riding areas outside of the Planning Area through substitution effects). Therefore, 57,750 towing vehicles are assumed to leave for alternative OHV areas outside the Planning Area, while the other 57,750 would disperse within the Planning Area. However, the 292,250 remaining towing vehicles left within the Planning Area would be further reduced due to the fact that there would be less riding area. Only 232,073 towing vehicles would remain within the Planning Area (i.e., $292,250 \times 80$ percent). This alternative represents roughly 66 percent of the existing base in terms of activity.

Alternative 4 would increase the riding areas within the Planning Area to 70,891 acres from 51,727 acres under Alternative 2. This represents a 37 percent increase in riding area. Assuming usage would increase in proportion to riding area, the estimated level of towing vehicles would increase to 479,669 (i.e., $350,000 \times [70,891 \div 51,727]$).

Alternative 5 may result in the closure of the Dunebuggy Flats campground. This would represent a 15 per cent decrease in Planning Area activity under current Alternative 2 levels. However, the potential 15 percent displacement would be assumed to be absorbed in other Planning Area campgrounds because the riding acreage would increase to 67,501 acres from the Alternative 2 base of 51,727 acres. Assuming usage would increase in proportion to riding area, the estimated level of towing vehicles would be 456,731 (i.e., $350,000 \times [67,501 \div 51,727]$).

Alternative 6 would increase the riding area to 70,020 acres. Assuming a proportional increase in usage, the estimated level of towing vehicles would be 473,776 (i.e., $350,000 \times [70,020 \div 51,727]$).

Alternative 7 would increase the riding area to 77,439 acres. Assuming a proportional increase in usage, the estimated level of towing vehicles would be 523,975 (i.e., $350,000 \times [77,439 \div 51,727]$).

Alternative 8 would increase the riding area to 79,038 acres. Assuming a proportional increase in usage up to the unconstrained limit of Alternative 1, the estimated level of towing vehicles would be 531,714 (i.e., $350,000 \times [79,038 \div 51,727]$).

4.18.2.3.2 Economic Impacts by Alternative

No significant economic impacts from recreational activities within the Planning Area were determined for any of the proposed alternatives. The net changes in economic activity from the baseline (existing condition) are listed for the direct, indirect, and cumulative impacts for each planning alternative as summarized in Table 4-17. As listed in the table, the largest increase in total economic output (\$88.6 million) for recreation would occur under Alternatives 1 and 8. The largest decline in total economic output (minus \$57.0 million) would occur under Alternative 3. Neither of these extremes represents a significant economic impact relative to the much larger EIA economy. Similarly, the cumulative employment impacts would range from an increase of about 1,111 jobs for Alternative 1 to a decrease of about 725 jobs for Alternative 3 and would not represent a significant economic impact relative to the much larger employment base (168,000) reported for the EIA economy.

TABLE 4-17
NET CHANGE IN ECONOMIC IMPACTS BY ALTERNATIVE:
ANNUAL RECREATION ACTIVITIES WITHIN THE PLANNING AREA

Impact Category	Direct	Indirect & Induced	Cumulative
Alternative 1			
Dollar Value	\$58,319,755	\$30,304,706	\$88,624,461
Employment	843.44	267.30	1,110.74
Labor Income	\$24,659,275	\$10,382,426	\$35,041,701
Property Income	\$6,755,379	\$5,479,893	\$12,235,272
Tax Revenue	\$7,712,116	\$1,696,567	\$9,408,683
Value Added	\$39,126,798	\$17,558,896	\$56,685,693
Alternative 2			
Dollar Value	\$0.00	\$ 0.00	\$ 0.00
Employment	0.00	0.00	0.00
Labor Income	\$0.00	\$ 0.00	\$ 0.00
Property Income	\$0.00	\$ 0.00	\$ 0.00
Tax Revenue	\$0.00	\$ 0.00	\$ 0.00
Value Added	\$0.00	\$ 0.00	\$ 0.00
Alternative 3			
Dollar Value	\$(38,057,370)	\$(19,775,761)	\$(57,833,131)
Employment	(550.42)	(174.42)	(724.84)
Labor Income	\$(16,091,754)	\$(6,775,197)	\$(22,866,951)
Property Income	\$(4,408,317)	\$(3,575,981)	\$(7,984,298)
Tax Revenue	\$(5,032,649)	\$(1,107,118)	\$(6,139,767)
Value Added	\$(25,532,738)	\$(11,458,302)	\$(36,991,040)
Alternative 4			
Dollar Value	\$41,985,705	\$21,817,041	\$63,802,746
Employment	607.22	192.44	799.66
Labor Income	\$17,752,767	\$7,474,543	\$25,227,310
Property Income	\$4,863,350	\$3,945,098	\$8,808,448
Tax Revenue	\$5,552,126	\$1,221,397	\$6,773,523
Value Added	\$28,168,263	\$12,641,044	\$40,809,307
Alternative 5			
Dollar Value	\$32,157,803	\$16,710,167	\$48,867,970
Employment	465.08	147.37	612.45
Labor Income	\$13,597,247	\$5,724,922	\$19,322,168
Property Income	\$3,724,950	\$3,021,640	\$6,746,590
Tax Revenue	\$4,252,499	\$935,495	\$5,187,995
Value Added	\$21,574,711	\$9,682,062	\$31,256,773

TABLE 4-17
NET CHANGE IN ECONOMIC IMPACTS BY ALTERNATIVE:
ANNUAL RECREATION ACTIVITIES WITHIN THE PLANNING AREA

Impact Category	Direct	Indirect & Induced	Cumulative
Alternative 6			
Dollar Value	\$36,659,018	\$19,049,132	\$55,708,150
Employment	530.19	168.03	698.22
Labor Income	\$15,500,490	\$6,526,254	\$22,026,745
Property Income	\$4,246,341	\$3,444,587	\$7,690,929
Tax Revenue	\$4,847,733	\$1,066,439	\$5,914,172
Value Added	\$24,594,582	\$11,037,287	\$35,631,869
Alternative 7			
Dollar Value	\$51,811,681	\$26,922,915	\$78,734,596
Employment	749.32	237.46	986.78
Labor Income	\$21,907,474	\$9,223,821	\$31,131,294
Property Income	\$6,001,527	\$4,868,376	\$10,869,902
Tax Revenue	\$6,851,498	\$1,507,242	\$8,358,740
Value Added	\$34,760,523	\$15,599,447	\$50,359,969

Note: The zero values in this table represent no change from the existing condition (the net economic impact that would result from implementing Alternative 2).

Source: MIG IMPLAN/Pro and CIC Research, Inc. (2006)

4.18.3 Social and Economic Impacts on Transportation and Public Access

4.18.3.1 Social Impacts

Motorized transport is not allowed in the wilderness. Motorized access within ACECs is limited to existing or designated routes, except as authorized. Representatives of the OHV community have suggested that they are reasonably satisfied with the current situation, but would object to further reductions. Other recreational communities, particularly non-motorized recreation communities, may view the reduction of OHV open areas as a beneficial social impact.

ROWs for renewable energy (i.e., solar and wind) could result in closure of areas to public access as a result of public health and safety concerns. These areas would be relatively small, and their closure would not likely cause significant social impacts. Access for authorized uses such as minerals extraction may also restrict access, but because the Planning Area has very few mineral resources, this access issue is unlikely to be significant.

No social impacts are anticipated to occur as a result of management activities and land use decisions related to transportation and public access proposed under all alternatives for the implementation of the ISD RAMP.

4.18.3.2 Economic Impacts

The majority of annual economic impacts for routes of travel on BLM land are associated with the maintenance of paved and unpaved roadways. As described in Chapter 2, the routes of travel are common to all alternatives. The Planning Area routes of travel annual maintenance costs would not change under any of the proposed alternatives (see Table 3-33). Therefore, all proposed alternatives for routes of travel would result in no change from the existing economic condition. No direct, indirect, or cumulative economic impacts would be generated for the EIA economy.

The annual economic value generated by maintenance of routes of travel within the Planning Area is an insignificant portion of the EIA economy and does not generate an adverse economic impact.

4.18.4 Social and Economic Impacts on Lands and Realty Program

4.18.4.1 Social Impacts

As communities expand and populations grow, there is an increased need for access across public lands for roads, utilities, and other infrastructure. The demand on public lands within the Planning Area to meet community needs includes, but is not limited to, utility corridors, renewable energy (such as solar and wind), apiary permits, film permits, and communications sites.

ROWs may enhance access to the public lands for recreational opportunities. In addition, ROWs may provide infrastructure for the needs of the recreating public (e.g., power lines, water, and sewer lines). However, ROW authorizations may adversely impact the recreational opportunities by encumbering public lands and viewsheds.

4.18.4.1.1 Utility Corridors

Public input suggests that social impact issues relating to utility corridors are primarily related to the visual impacts of high voltage power lines. Under all alternatives, major utility ROWs would be placed within the existing utility corridors, which would minimize new visual adverse impacts to already impacted areas.

Designated utility corridors and communications sites allow for the installation of additional facilities to provide services to the recreation community as it grows. This

would likely enhance the social environment by allowing additional infrastructure to meet public demands and needs.

4.18.4.1.2 Renewable Energy

Social impacts of renewable energy development relate primarily to visual impacts and loss of access. Anecdotal evidence suggests that some people view solar and wind power generating facilities as a form of visual pollution. Social impacts may also include noise and dust from roads required to access facilities and closure of recreation areas for facility development and security. The environmental community has tended to look upon renewable energy facilities as a way of reducing air and water pollution associated with fossil fuel production, resulting in a beneficial social impact to this community.

4.18.4.2 Economic Impacts

4.18.4.2.1 Utility Corridors

The majority of annual economic impacts for utility corridor ROWs are associated with the cleaning, inspection, and maintenance of transmission towers and overhead lines, or alternatively underground pipelines and conduits. The average land development and construction cost may vary significantly with terrain and other factors. San Diego Gas and Electric is a major user of utility ROWs on BLM-administered lands. The average annual cost per mile of maintained utility ROW ranges from \$30,000 to \$40,000 per mile within the Planning Area based on data provided by San Diego Gas & Electric. The Planning Area utility corridor ROW would not change under any of the resource management plan alternatives. Therefore, all proposed alternatives for utility corridor ROW would result in no change from the existing economic condition. No direct, indirect, or cumulative economic impacts would be generated for the EIA economy.

The annual economic value generated by annual maintenance of utility corridors within the Planning Area is an insignificant portion of the \$23.1 billion total output within the EIA economy and does not generate an adverse economic impact.

4.18.4.2.2 Communication Sites

No new communication sites are proposed under any of the proposed alternatives. No changes in the economic condition of communications sites under the lands and realty program are anticipated; therefore, no economic impacts due to the proposed alternatives would be expected. The cumulative annual impacts would be insignificant relative to the size of the EIA economy.

The annual economic value generated by BLM communication facilities represents a very small portion of the Planning Area EIA economy and would not be expected to have a substantial economic impact, beneficial or adverse. The annual economic value

generated by annual maintenance of communication sites within the Planning Area is an insignificant portion of the \$23.1 billion total output within the EIA economy and does not generate an adverse economic impact.

4.18.4.2.3 Apiary Permits

Apiary permit activity and resource management would not change under Alternatives 1, 2, 4, 5, 6, 7, and 8. As a result there would be no economic change for these alternatives compared with the existing condition (Table 4-18). Apiary permits would not be allowed under Alternative 3. The resulting net cumulative total economic impact of Alternative 3 would be a decrease in output of about \$361,000 per year and a cumulative decrease of about 3.6 jobs per year. This level of decrease in economic output and labor is negligible and would not have an adverse impact on the EIA economy.

The annual economic value generated by annual apiary production activities within the Planning Area is an insignificant portion of the \$23.1 billion total output within the EIA economy and does not generate an adverse economic impact.

TABLE 4-18
NET CHANGE IN ECONOMIC IMPACTS BY ALTERNATIVE:
APIARY PERMITS AND ANNUAL BEEHIVE PRODUCTION WITHIN THE
PLANNING AREA

Impact Category	Direct	Indirect & Induced	Cumulative
Alternatives 1, 2, 4, 5, 6, 7, and 8			
Dollar Value	\$0.00	\$0.00	\$0.00
Employment	0.00	0.00	0.00
Labor Income	\$0.00	\$0.00	\$0.00
Property Income	\$0.00	\$0.00	\$0.00
Tax Revenue	\$0.00	\$0.00	\$0.00
Value Added	\$0.00	\$0.00	\$0.00
Alternative 3			
Dollar Value	\$(227,500)	\$(133,298)	\$(360,798)
Employment	(2.42)	(1.14)	(3.56)
Labor Income	\$(68,893)	\$(41,433)	\$(110,326)
Property Income	\$(41,807)	\$(24,008)	\$(65,814)
Tax Revenue	\$(6,089)	\$(6,650)	\$(12,740)
Value Added	\$(116,789)	\$(72,091)	\$(188,880)

Note: The zero values in this table represent no change from the existing condition (the net economic impact that would result from implementing Alternatives 1, 2, 4, 5, 6, 7, or 8).

Source: MIG IMPLAN/Pro and CIC Research, Inc. (2006)

4.18.4.2.4 Renewable Energy

There is no current commercial production of solar or wind energy on BLM-administered lands within the Planning Area. If and when a project is proposed to the BLM, the BLM and operator(s) would need to prepare a project-specific POD. Each POD would need to address the potential impacts—including economic and social impacts—of proposed solar or wind energy lease and development.

4.18.4.2.5 Film Permits

Film permit activity and resource management would not change under any of the proposed alternatives. As a result there would be no economic change compared with the existing condition (see Table 3-37). No cumulative economic impacts to the EIA economy would be generated by any of the alternatives for film permits and film or still photograph activities in the Planning Area.

The annual economic value generated by commercial filming and photography activities within the Planning Area is an insignificant portion of the EIA economy and does not generate an adverse economic impact.

4.18.5 Summary of Economic Impacts by Alternative

No significant economic impacts were determined for any of the proposed alternatives. The net change in the combined cumulative impacts (the net change in total impact over all resource management programs) for each alternative is summarized in Table 4-17. The total annual economic value generated by Planning Area land use activities is an insignificant portion of the economic impact area economy and does not generate an adverse economic impact.

As listed in Table 4-19, the largest increase in total economic output (\$88.6 million) would occur under Alternatives 1 and 8. The largest decline in total economic output (minus \$57.8 million) would occur under Alternative 3. None of these extremes (Alternative 1, 8, or 3) represents a significant economic impact change relative to the much larger EIA economy. Similarly, the cumulative employment impacts would range from an increase of about 1,111 jobs under Alternative 1 to a decrease of about 714 jobs under Alternative 3 and would not represent a significant economic impact relative to the much larger employment base (168,000) reported for the EIA economy.

**TABLE 4-19
NET CHANGE IN ECONOMIC IMPACTS BY ALTERNATIVE:
ANNUAL TOTAL ACTIVITY WITHIN THE PLANNING AREA**

Impact Category	Direct	Indirect & Induced	Cumulative
Alternative 1			
Dollar Value	\$58,330,255	\$30,310,787	\$88,641,042
Employment	843.53	267.35	1,110.88
Labor Income	\$24,663,529	\$10,384,489	\$35,048,018
Property Income	\$6,755,933	\$5,480,818	\$12,236,751
Tax Revenue	\$7,712,259	\$1,696,938	\$9,409,197
Value Added	\$39,131,749	\$17,562,254	\$56,694,003
Alternative 2			
Dollar Value	\$(217,000)	\$(127,217)	\$(344,217)
Employment	(2.33)	(1.09)	(3.42)
Labor Income	\$(64,639)	\$(39,371)	\$(104,010)
Property Income	\$(41,253)	\$(23,083)	\$(64,336)
Tax Revenue	\$(5,946)	\$(6,279)	\$(12,225)
Value Added	\$(111,838)	\$(68,733)	\$(180,571)
Alternative 3			
Dollar Value	\$(38,064,796)	\$(19,794,079)	\$(57,858,875)
Employment	(549.72)	(174.55)	(724.27)
Labor Income	\$(16,067,779)	\$(6,777,258)	\$(22,845,037)
Property Income	\$(4,425,294)	\$(3,579,372)	\$(8,004,666)
Tax Revenue	\$(5,010,881)	\$(1,107,301)	\$(6,118,182)
Value Added	\$(25,503,972)	\$(11,463,937)	\$(36,967,909)
Alternative 4			
Dollar Value	\$41,626,797	\$21,631,165	\$63,257,962
Employment	601.97	190.76	792.73
Labor Income	\$17,600,825	\$7,410,841	\$25,011,666
Property Income	\$4,821,114	\$3,911,312	\$8,732,426
Tax Revenue	\$5,503,419	\$1,211,021	\$6,714,441
Value Added	\$27,925,378	\$12,533,181	\$40,458,559
Alternative 5			
Dollar Value	\$34,265,020	\$17,805,764	\$52,070,784
Employment	495.50	157.04	652.54
Labor Income	\$14,488,054	\$6,100,254	\$20,588,308
Property Income	\$3,968,373	\$3,219,579	\$7,187,952
Tax Revenue	\$4,529,909	\$996,862	\$5,526,771
Value Added	\$22,986,352	\$10,316,700	\$33,303,052

TABLE 4-19
NET CHANGE IN ECONOMIC IMPACTS BY ALTERNATIVE:
ANNUAL TOTAL ACTIVITY WITHIN THE PLANNING AREA

Impact Category	Direct	Indirect & Induced	Cumulative
Alternative 6			
Dollar Value	\$39,735,486	\$20,648,386	\$60,383,872
Employment	574.60	182.12	756.72
Labor Income	\$16,801,125	\$7,074,138	\$23,875,263
Property Income	\$4,602,036	\$3,733,599	\$8,335,636
Tax Revenue	\$5,253,315	\$1,156,002	\$6,409,317
Value Added	\$26,656,495	\$11,963,746	\$38,620,241
Alternative 7			
Dollar Value	\$55,846,160	\$29,019,978	\$84,866,138
Employment	807.62	255.96	1,063.58
Labor Income	\$23,613,182	\$9,942,255	\$33,555,438
Property Income	\$6,468,192	\$5,247,405	\$11,715,597
Tax Revenue	\$7,383,766	\$1,624,674	\$9,008,440
Value Added	\$37,465,166	\$16,814,343	\$54,279,510
Alternative 8			
Dollar Value	\$58,330,255	\$30,310,787	\$88,641,042
Employment	843.53	267.35	1,110.88
Labor Income	\$24,663,529	\$10,384,489	\$35,048,018
Property Income	\$6,755,933	\$5,480,818	\$12,236,751
Tax Revenue	\$7,712,259	\$1,696,938	\$9,409,197
Value Added	\$39,131,749	\$17,562,254	\$56,694,003

Source: MIG IMPLAN/Pro and CIC Research, Inc. (2006)

It was not unexpected, but it is interesting to note that recreational activities within the Planning Area are responsible for more than 98 percent of the cumulative total economic output generated for the Planning Area. Furthermore, recreational activities are responsible for more than 99 percent of the net cumulative change in economic output expected for each proposed alternative.

4.18.6 Irreversible and Irretrievable Commitment of Resources

Implementation of the Proposed RAMP/CDCA Plan Amendment would not likely result in irreversible and irretrievable commitment of resources related to socioeconomics within the Planning Area.

4.18.7 Unavoidable Adverse Impacts

There would be no unavoidable adverse social or economic impacts as a result of implementing the Proposed RAMP/CDCA Plan amendment.

4.18.8 Short-term Use and/or Long-term Productivity

Implementation of the Proposed RAMP/CDCA Plan Amendment would not likely result in the short-term use of resources that impacts long-term productivity related to socioeconomics.

4.18.9 Cumulative Impacts

4.18.9.1 Geographic Extent

The geographic extent for social and economic cumulative impacts is primarily Imperial County. The social and economic existing conditions in the Planning Area, which represents the aggregate effect of past and present actions, are described in Chapter 3, Section 3.18.

4.18.9.2 Reasonably Foreseeable Projects

Table 4.1 provides a list of current and reasonably foreseeable projects, including proposed renewable energy projects, various BLM-authorized actions, and other actions that may be considered. Most projects have either undergone independent environmental review pursuant to NEPA (and in some cases pursuant to the California Environmental Quality Act) or will do so prior to approval. The reasonably foreseeable projects that may affect socioeconomics are listed in Table 4.1.

4.18.9.3 Cumulative Impact Differences between Alternatives

Cumulative impact analysis is included above in the analysis for impacts by alternative.

4.18.10 Mitigation Measures

No mitigation measures for socioeconomics would be required for implementation of the Proposed RAMP/CDCA Plan Amendment.

4.19 Impacts on Environmental Justice

The goal of EO 12898, issued in 1994, was to preclude federal actions from creating disproportionate impacts to minority and low-income populations. Economic data upon

which to base possible environmental justice effects (i.e., the geographic distribution of minority and low-income populations and their changes over time) were presented in Chapter 3, Section 3.19.

The economic data and discussion in Chapter 3, Section 3.19 did not reveal evidence of environmental justice issues. Implementing any of the proposed alternatives would not result in disproportionate adverse plan-related effects on minority or low-income groups. No substantial changes to ethnic communities or low-income neighborhoods were detected. There is no indication that any of the proposed alternatives would have substantial adverse economic effects on any particular ethnic or low-income group as compared to others.

Field observations suggest that visitors to the Planning Area are overwhelmingly White. Management decisions within the Planning Area would not likely affect a minority population.

There are no identifiable disproportionate adverse impacts to the Quechan or other Native American tribes in the area. There is no evidence to suggest that environmental justice is an issue within the Planning Area.

BLM management actions and land use decisions are primarily driven by the resource base and the public involvement process. Unlike other entities involved in siting of facilities and land uses within a community or region, BLM makes resource decisions relying most heavily on where the particular resources occur (e.g., geothermal potential areas and vegetative communities) and where the visitor uses have occurred in the past (e.g., OHV recreation and camping areas).

4.19.1 Minority and Low-income Communities

The BLM is aware that there are small pockets of poverty and/or minority populations scattered throughout the region of the Planning Area. However, the BLM has not identified any communities within the Planning Area with low income or minority populations that may be impacted by proposed alternatives for BLM-administered lands.